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## WOOD VERSUS SOME OF ITS SUBSTITUTES

By R. C. BRYANT

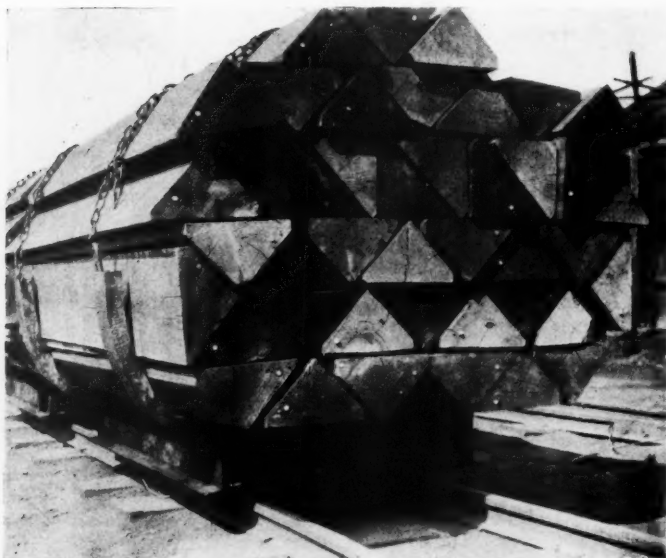
THE lumber industry has begun to view with alarm the rapid encroachments which substitutes for wood have made and still continue to make in the field of wood products. This inroad is not confined to any particular kind of wood or class of material, but it has been felt most keenly in the inferior grades of lumber which have been consumed in immense quantities for boxes, crates, and innumerable other purposes.

Economy and the public welfare demand that we use in a conservative manner the resources at our command and therefore, the substitution of steel, concrete or other materials is to be commended where the public at large is benefited either directly or indirectly. There are instances, however, where it is not for the public interest to make such changes, since the final result is not an economic gain but a loss.

The substitution of other building materials for the high-grade lumber formerly used may be justified in some cases on the grounds that better wood material was used than was necessary or that the demands for the high-grade lumber by new or expanded forms of industry has so increased that our depleted forests are unable to supply certain kinds of material in sufficient quantities to meet the public needs in those industries unless retrenchment is made where it will be least felt. It is an economic waste to use better wood materials than are required for a specific purpose, but it is regarded as a direct economic loss when low grade woods suitable only for a few specific purposes are displaced by substitutes and the wood product thereby rendered

of such low value that the lumberman can not market it, and therefore destroys it at his manufacturing plant or else leaves the timber in the forest to rot.

The extent to which close utilization of stumpage can be effected is dependent directly on the markets for and the prices which can be secured for the low-grade material which comprises more than 50 per cent of the lumber cut of the United States. The lumberman removes from the forest only as much of the stand as he believes can be marketed at a profit, although every defective log may contain some cull material which must be handled in order to secure the higher grade lumber on which a profit can be made. The last few years has seen a marked change in the character and amount of timber which is taken from a given acre of land, a fact well illustrated in the southern pine region. Where formerly only the choicest trees and the best logs from these same trees were taken, lumbermen have now reached a point, due to higher stumpage values and increased market prices for lumber, where the entire stand of pine is removed down to a diameter of from twelve to fourteen inches, in some cases still lower; where low stumps are cut and where defective and knotty top logs are taken to the mill. The yield per acre for stands of the same character has increased from four hundred to five hundred per cent for the above reasons. It is a mistaken theory to assume that a competition in low-grade lumber, which comprises much of this increased yield per acre, reduces the lumber cut and thereby prolongs the life of the operation. On the contrary, the reverse is true, since



TRUCK LOAD OF TRIANGULAR CROSS TIES READY FOR TREATMENT AT THE GREAT NORTHERN RAILWAY CO.'S TREATING PLANT, SOMERS, FLATHEAD COUNTY, MONTANA.

the annual output of a large lumber manufacturing plant is more or less regulated by the investment, and the operator who has large carrying charges to meet both on the investment in the raw product and in plant facilities will still maintain his average output, but will leave in the forest to rot such material as can not be sold at a profit. This means that all of the usable material is not removed and the lumberman, therefore, must cut over a greater acreage to secure the amount of raw product he requires. This hastens the exhaustion of his timber supply and likewise affects every citizen who in the future must use wood.

It is essential both from the standpoint of national economy as well as from the direct standpoint of forestry that this material shall continue to find a profitable market in addition to the saplings and other small material which may result from the thinning of artificial forests. We are all, therefore, vitally interested, or should be, in the creation and maintenance of profitable markets for this class of material.

The marketing of high-grade lumber is not so difficult since there is a steady demand for this class of material, and as timber becomes scarcer the problem of placing the better grades on the market will become more simple even than it is today.

One of the largest markets for low grade material and for trimmings from the sawmill and the planing mill has been in the manufacture of crates and boxes for holding all sorts of vegetables, canned goods, soap, starch, crackers, etc. A recent estimate of the Secretary-Manager of the National Lumber Manufacturers' Association places the annual consumption of wood for the above and similar purposes at more than six billion feet, or about 20 per cent of the total lumber production of the entire country. Much of this lumber was not valuable for other purposes, and if it had not been used as stated the logs which contained it either would have been left in the forest, or the lumber of box quality would have been burned at the mill.

The importance of the box trade to



TRESTLE BUILT OF TIMBER CUT AND SAWED IN THE VICINITY ON LINE OF GREAT NORTHERN RAILWAY, FLATHEAD, MONTANA.

FOR TRESTLES AND BRIDGES WOOD HAS BEEN SUPERSEDED BY STEEL, CONCRETE, AND MASONRY. YET IN PIONEER CONSTRUCTION THROUGH TIMBERED COUNTRY THE WOODEN TRESTLE STILL HOLDS ITS OWN.



UNTREATED TIES PILED IN YARD AND TRAM TRACKS, ESCANABA, DELTA COUNTY, MICHIGAN. There has never been a successful substitute for the wooden tie and engineers are willing to admit there never can be. When treated with preservatives a large measure of permanence is added to their other good qualities.

certain sections of the country may be better appreciated when it is stated that from 20 to 25 per cent of the eastern white pine, from 25 to 30 per cent of the California white pine, 2 per cent of spruce, 75 per cent of the hemlock of Wisconsin, Michigan and Pennsylvania, and 20 per cent of the yellow pine is made into containers of various sorts. A recent authority credits the cracker industry with having used 75 million feet of lumber for cracker boxes in 1912, canned goods packers 350 million feet, piano box manufacturers 250 million feet, apple box manufacturers 200 million feet, soap box makers from 75 to 100 million feet, starch box manufacturers from 75 to 100 million feet, fruit and vegetable package manufacturers from 150 to 200 million feet, and boxes for standard oil products 300 million feet.

The lumbermen have within the last few years become greatly alarmed over the heavy inroads fiber boxes have made into their trade and have been endeavoring to hold their market at any cost.

They have only met with a partial measure of success, since the fiber package is lighter in weight and its sale has been more widely and persistently pushed than has the wooden box.

Another important product which is now being discriminated against in some sections is the wooden shingle. This had been one of the most common forms of roof covering in use in this country and for many years its value for this purpose was unquestioned both from the standpoint of wearing quality and of cost. There are today few if any roof coverings which give such good satisfaction, which can be placed on a building for as low a cost, which can be repaired as cheaply and readily and which give greater value for the money than do first class wooden shingles.

They have been discriminated against in some cities on account of the fire hazard which is supposed to attend their use but which has undoubtedly been exaggerated, at least in some cases.

The chief competitors of shingles are a host of prepared roofings of a wide





TIES SKIDDER READY FOR SHIPMENT DOWN A FLUME.

range of quality; tin and galvanized iron; asbestos shingles; slate and tile, etc. The most serious competitor is that with prepared roofing and metal roofing. There are several reasons for this, some of which may be ascribed to the shingles themselves, the others to outside agencies. Among them may be mentioned the reduced life of the present-day shingle roof owing to the use of wire nails which rust off in a few years; in some instances to improper kiln-drying at the plants which takes the "life" out of the shingles and makes them inferior in quality.

A very important feature in connection with the substitution of materials other than wood for roof coverings has been the apathy of the shingle manufacturers on the one hand, and the strenuous advertising campaign of the substitute manufacturers on the other. The producers of all kinds of wood products for years devoted very little attention to the advertising of their wares. The introduction of substitutes, especially steel and concrete, as building materials did not seem to awaken the lumbermen from their indifference to advertising, and before they were fully aware of what had happened the substitutes had gained such a strong hold on the builder that it could not be overcome. The lumber manufacturers now appreciate that the lumber trade can be saved only by creating a desire for lumber on the part of the public. Sectional advertising campaigns have been conducted by lumber interests for some years and it is now being taken up by the lumber industry as a national problem.

Shingle men, in spite of the inroads that have been made on their business, have not yet shown as great activity in pushing their product as have their chief competitors. Every magazine today contains from one to several advertisements of substitutes for wooden shingles and, further, a strong personal effort is put forth by firms manufacturing such goods to get in touch with the retail dealer who sells roof coverings, offering special inducements to carry a stock and also to push the product. All of these things must be done to intro-

duce a new product which is to displace an old well-established article. The shingle man on the other hand usually has a smaller business organization, less funds for advertising purposes and has allowed his competitors to enter the field without a struggle.

However, the shingle makers at last realize that they have delayed too long, and the struggle for supremacy is now on, being manifested by the effort made by some cities to prevent the use of shingles in them and the opposition to this ruling on the part of shingle manufacturers and dealers who are now engaged in a strenuous effort to produce a fire-retardant paint which will decrease the fire risk of wooden roofing and permit the use of shingles. This problem is still far from a satisfactory solution, but it is believed that the efforts now being put forth will result, at least, in a fair measure of success and make it possible to again use shingles in most of the cities which have recently passed ordinances prohibiting their use. From the standpoint of forest conservation it is very desirable that a wider field for sale and a greater demand for shingle consumption should be secured since the waste in shingle manufacture is now very great. The West, which produces a very large per cent of the total number of shingles manufactured in the country, is far removed from the great consuming centers of the middle West and the Eastern States and on account of the high freight rates into the territory east of the Rocky Mountains and the keen competition with the various substitutes, the shingle producers of the Pacific Coast find it profitable to manufacture only the best grades of shingles. It is hoped that the opening of the Panama Canal may improve the conditions under which western shingles are marketed and thus permit a closer utilization of the red cedar of the West.

Lath are a by-product in nearly every large sawmill, being made from slabs and edgings which otherwise would be consumed in a refuse burner at an expense to the lumber manufacturer. It is very desirable that the manufacturer of lath shall continue since there is not a market for much of the



GROVE OF HARDY CATALPA ON PLACE OF MRS. F. W. KRUCKMAN, 14 YEARS FROM SEED. WEBSTER CO., IOWA. FENCE POSTS CAN STILL BE GROWN AT AN ECONOMIC ADVANTAGE AND WITH DECAY-RESISTING MATERIAL ARE CHEAPER AND EASIER TO HANDLE THAN ANY SUBSTITUTE.

rough material in any other form. The introduction of various metal substitutes for lath threatens to restrict the market for the wood product, causing a waste of raw material at the mill.

Another field in which wood formerly reigned supreme but which is now gradually being usurped by substitutes is that of fence posts. It is almost universally recognized that the wood fence post is the most satisfactory form of fence support, because of the ease with which it can be placed in position, and the fence material attached to it, and the facility with which fence repairs may be made. The comparatively short life of posts made from some species of trees, and the increasing cost of posts made from the more desirable species has led to the introduction of substitutes both of concrete and of steel. The greatest market for the substitutes has been and probably will continue to be in the great agricultural section of the Middle West which is largely devoid of forest areas from which fence posts

may be secured in large quantities. The high cost of wooden posts shipped into the region from distant points makes the prairie States a lucrative field for the concrete or metal posts. The concrete post is probably the more popular with agriculturists since it can be made on the farm at a reasonable cost. It is believed, however, that the future development of farm forestry will increase the consumption of wooden posts since each farmer may devote a limited area to the production of such fence posts as he requires from fast growing species which are capable of treatment with chemical preservatives at a reasonable cost.

For a great many years millions of feet of lumber were annually consumed in the construction and repair of sidewalks in the smaller cities and in the villages of the country. The first competitor of wood for walks was the brick, which made a more durable structure, but which had many unsatisfactory features after it had been laid for some

years. Since the advent of concrete, wooden and brick walks have, to a very large extent, been replaced by structures made from it, which is far more satisfactory than either. This substitution of concrete for wood has been a desirable thing since it has reduced the consumption of a high grade of lumber which has since found a strong demand for other lines of construction.

Another field in which wood is being largely replaced is in the construction of small bridges and culverts on public highways. Formerly these were constructed almost exclusively of wood. Cheap transportation to market for agricultural products is one of the first requisites for the farmer and this has brought about the construction of a very large mileage of low-grade macadamized roads of permanent character. The small bridges and culverts are being given a greater permanency than formerly by constructing them of concrete. While more expensive than wooden structures, if properly built, they are more permanent in character and reduce the cost of road maintenance. This is in line with efficiency and is desirable from every point of view.

One of the largest consumers of lumber is the railroad industry which has need of immense quantities of wood for crossties, bridge timbers, buildings, car construction, sign boards, and like uses.

The crosstie situation has been a pressing one with railroad companies for many years due to the rapidly increasing price of durable woods and the greatly diminished supply. For years repeated efforts have been made to perfect a tie made from material other than wood, which would fulfil the railroads' needs, but so far the results have not been satisfactory. Steel ties of various patterns have been patented and numerous forms of reinforced concrete ones have been offered but all have so far been pronounced undesirable. The difficulty appears to be that metal or concrete ties are too rigid and unyielding and therefore are hard on the locomotives; that steel ties become brittle and break under the continuous pounding of heavy traffic and that concrete ties disintegrate both through the action

of frost and the continuous pounding of heavy traffic.

There does not appear to be any substitute for wooden ties which can meet the requirements. The main drawback to the wood crosstie being its non-durable quality. The problem is now being solved by the use of inferior species of woods and treating them with some form of chemical preservative which if properly done renders them immune to decay. The preservative treatment of a large number of species which could not be used untreated has opened up a large source of supply hitherto inaccessible and is going a large way towards solving the problem for the railway transportation companies of the country.

The lumber industry has not been so fortunate in holding the railroad trade in large timbers for bridge construction, since steel has largely replaced wood in large structures and concrete in the smaller ones. This can not be regarded as a serious calamity, however, at least from the public point of view since a steel or concrete structure if properly constructed and cared for is more lasting than the ordinary structures of wood, and therefore is to be preferred for this purpose since in the long run it will aid in prolonging the time when the supply of large trees, from which railroad bridge timbers must be cut, will be exhausted.

Railroads still consume large quantities of lumber for stations and other buildings although the railroads are coming more and more to construct such buildings of brick or concrete because of the more durable character of the structure.

The construction of cars for years has required a very large amount of lumber, but today the demands for wood for this purpose are decreasing, due to the increased use of steel for the construction both of passenger and freight cars. The average size box car if constructed of wood requires about 6,500 board feet of lumber, and the average size gondola, coke or ore cars, 4,000 feet. In 1911 an estimate of the number of cars exclusive of passenger, which were constructed, was about

180,000, of which number 60,000 were gondola, coke or ore cars, and 120,000 box cars. Had these been constructed of wood as they were formerly the total lumber requirement for these cars alone would have been in excess of one billion feet. As a matter of fact, however, practically all of the gondola, coke and ore cars were constructed of steel and 80 per cent of the box cars had a steel underframe which reduced the amount of lumber required from 6,500 board feet per car to 4,000 board feet per car, so that the actual lumber consumption was 540,000,000 board feet, about one-half of what it would have been had the entire car been of wood. This loss of a market for 1.35 per cent of the total lumber cut of the country has been felt by the lumber industry to some extent but the result was not unforeseen on their part since it is admitted by all experts that a steel-frame car is superior to a wooden one. All are not yet agreed, however, that an all-steel car is a safer or better car than the steel-frame wooden car. The abandonment of the wooden frame is in line with modern progress as regards safety and as such should be encouraged, but in justice to lumber manufacturers the public should not commit itself to the all-steel passenger car and freight car until the matter has been decided by impartial experts.

Another interesting example of substitution of metal for wood is in the manufacture of office furniture, including desks, filing cabinets, and chairs. These have little merit over wood, since it is doubtful if they are fireproof in character and further when injured or sprung in any part of the structure it is difficult to repair. The steel furniture trade has not yet made great inroads on the product made from wood and will probably never command more than a limited share of the furniture business, since a large percentage of the average furniture sells for a price below that for which steel articles of the same character could be marketed.

Strong efforts have been made in some cities especially in New York, to forbid the use of wood interior trim in buildings more than a specified number of stories in height. The plea on which ordinances of this character are introduced is the reduction of the fire danger. The passage of such an ordinance would be an act of injustice to those who handle wood, and an exhibit of favoritism to those concerns which now manufacture metal interior trim. It is yet to be proved that the very limited amount of wood now used for trim in a large office building is a distinct fire menace or that it increases the fire risk. In case this is true, it is possible to so treat wood with a fire-retardant that the danger that may exist is eliminated.

There has been a tendency for some time past to substitute concrete floors for wooden ones in factory construction, on the plea of greater durability and of decreased fire risk. This has appreciably reduced the amount of wood flooring materials demanded for this purpose. The concrete floors, however, have not met all of the requirements for a satisfactory floor, since they are harder upon the workmen who must travel continually back and forth upon them; they have a deleterious effect upon the health of employees who must stand upon the cold surface during working hours; and the dust which arises from the gradual wearing of the floor settles on the bearings of machinery and causes a greater wear than where wooden floors are used. The many advantages of the wooden floor will undoubtedly enable it to hold its own in the future, and it is believed in many factories which still insist on a concrete subfloor will in the future employ a top covering of wood.

The public should give the lumbermen every encouragement possible to utilize to the fullest extent his forest resources and thereby eliminate the economic loss which results from a reduced market for low grade products.

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*The Canadian Forestry Association, which recently met in Ottawa, has selected Halifax, Nova Scotia, for its next annual meeting place.*



## HARDWOOD FORESTS OF SOUTHERN SOUTH AMERICA

By H. G. CUTLER

NATIONS are slower to learn by experience than even individuals. Perhaps because small bodies move more rapidly than the massive ones. But isn't it a fact, throwing the cause aside?

If I shall have the privilege in the great hereafter of viewing the progress of mundane affairs, I know that I shall be curious to know how long it will be before the nations of the earth will appreciate the blessings which nature has showered upon them, and not, in the mere gluttony of the good things of life, scatter them to the winds with wanton wickedness. In spite of the warnings which have come to the older sinners of the earth, such as Germany, France, the United States and others who have seen the error of their ways, Argentina and Paraguay, which embrace the cream of the hardwood forests of southern South America, are allowing them to melt away before the onslaught of land, railway and manufacturing corporations.

The strong soil has presented the southern republics with vast forests of quebracho, cypress, oak, cedar and lignum vitae, as well as those varieties which are her own special offspring—coigue, alerce and manu—and, in repayment of this generosity, the governments of men have allowed them to be ravished at will, for the payment of paltry sums and in blind forgetfulness of the future. But they say, "Sufficient unto the day is the evil thereof. Why worry? We need the money to live on. The future has always taken care of itself in some way."

True. Nature has always been very good to mankind, in view of how mankind has treated nature. When the forests commenced to thin out, Coal began to yield his treasures. Coal gets to be too cumbersome to be carried into every nook of the universe, and is altogether absent in such great lands

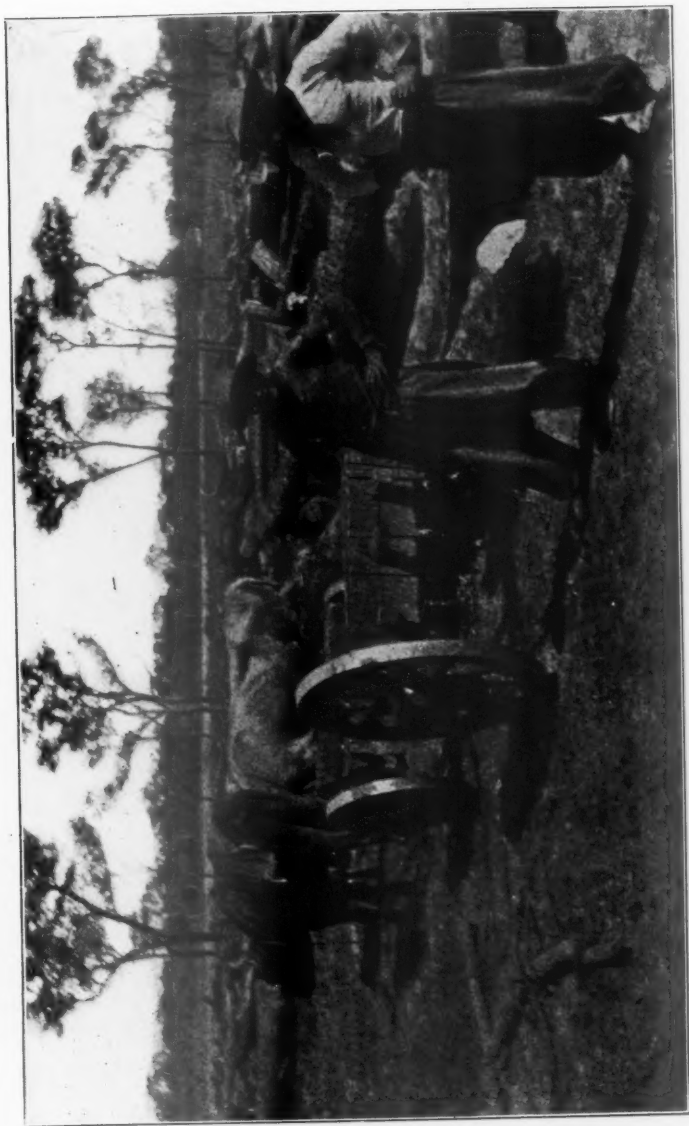


AN INDIAN OF THE CHACO HARDWOOD FORESTS.

as Argentina, and petroleum flows from the bowels of the earth into the furnaces of war ships, factories and residences. Nature has been a thoughtful, tender mother to careless, ungrateful children. Is it not time that the new, undeveloped nations show their gratitude to her by refusing, from the first, to waste their lives in riotous living?

Along this line is the following from a publication issued from Buenos Aires, the splendid capital of Argentina and financial center of the great companies which are especially exploiting the vast forests of quebracho in the northern and northeastern sections of the republic: "Attention has been repeatedly called to the danger of the extinction of the quebracho, as little or no check has been placed on the reckless methods of forest exploitation in vogue for many years past. If these are still permitted, according to a very high Argentine





LOADING QUEBRACHO LOGS (ROLLIZOS).  
IN THE EARLY DAYS OF THE TIMBER INDUSTRY OF "THE CHACO" THE NATIVE WAY OF HANDLING LOGS WAS VERY PRIMITIVE. THE OLD TWO-WHEELED CART  
IS NOW DISPLACED BY SUBSTANTIAL WAGONS, HOWEVER, AND THE WORK IS CARRIED ON EXPEDITIOUSLY.



LOADING QUEBRACHO LOGS ON A LOCAL RAILWAY.  
QUEBRACHO INDUSTRIAL COMPANIES HAVE INTRODUCED ALL MODERN IMPROVEMENTS IN HANDLING THEIR PRODUCT, AND HAVE LAID SMALL RAILWAYS INTO THE FOREST, ON WHICH LOGS ARE CARRIED TO THE MILL AND THENCE TO THE TRUNK LINES OF PARAGUAY AND ARGENTINA.



THE EDGE OF "THE CHACO" IN ARGENTINA.  
THIS IS AN OUTLYING VILLAGE CELEBRATING THE NATIONAL HOLIDAY (MAY 25). FROM HERE THE  
WORKMEN SKILLED IN WOODCRAFT JOURNEY INTO THE WILDERNESS IN SEARCH OF QUEBRACHO.

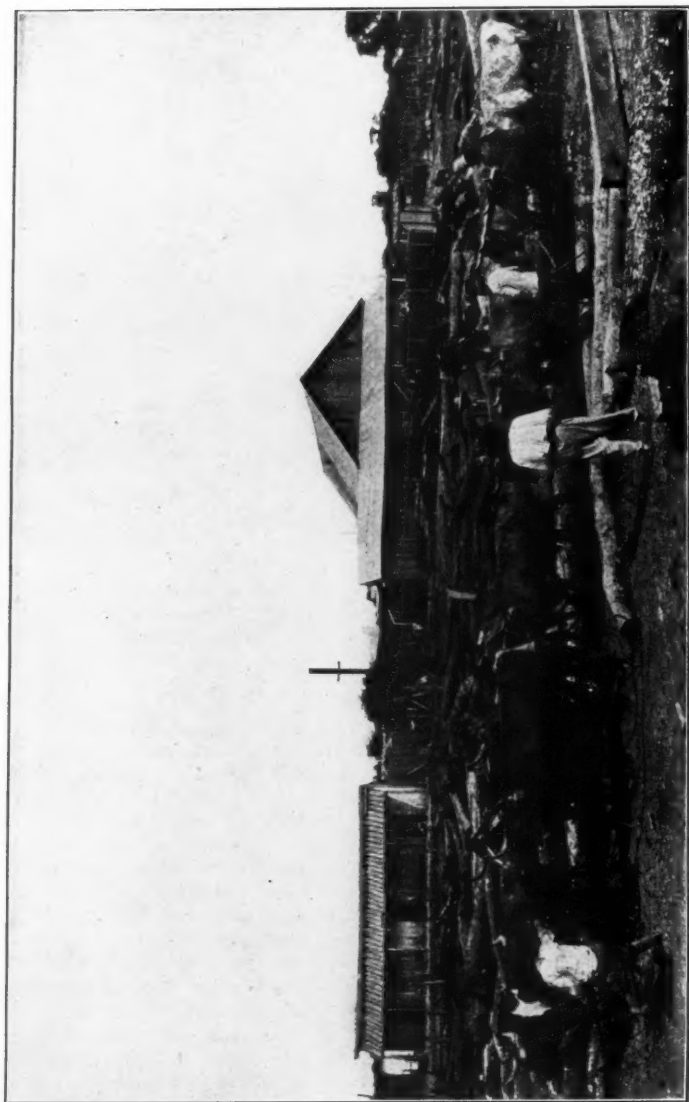
authority, few existing quebracho trees will be left standing, as no provision for future systematic planting is being made. There is a constant outcry in the native press for the passing of improved forestry laws, but as yet this very pressing matter has not obtained its share of consideration from Congress. Not only the quebracho, but many other valuable species of trees with which the vast forests of the republic abound, are in danger of extinction in the not very distant future as the result of inadequate forestry laws. It is a matter for wonder that the several foreign companies having large capital invested in the exploitation of the quebracho have not shown systematic regard for their own future interests.

"The red quebracho furnishes a hard, close-fibred wood, which is chiefly used for railway sleepers and fencing posts and for the extraction of the tannin, in which it is very rich. Its adaptability for sleepers and posts is first class.

"In the matter of railway sleepers the exports of quebracho logs has been constantly diminishing since 1900. In a

much less degree there has been a shrinkage in the number of sleepers used by the Argentine railway companies. The chief cause of this decrease is the competition of steel sleepers. As to the comparative economical advantages of these latter for use in Argentine, expert opinions vary. It may be noted, however, that the provision of the law under which railway companies are permitted to import material duty free is an important factor in the rivalry of steel and quebracho sleepers. Neither Europe nor the United States has ever imported considerable quantities of sleepers from Argentina, and these overseas imports have ceased entirely since 1903. Uruguay and Brazil have been the best customers, with a gradual decline even in their trade.

"The general increase in the exportation of logs is explained by the growing appreciation abroad of the fine qualities of the timber for fencing, building and cabinet-making. It is dense and compact of fibre and water-resisting, besides which its mahogany color contributes to handsome decoration and it takes a



AN ASSEMBLING POINT FOR QUEBRACHO LOGS.

NEWLY FELLED LOGS OF QUEBRACHO ARE HAULED TO THE NEAREST STATION OR MILL BY OXEN IN THE PRIMITIVE METHOD BEST UNDERSTOOD BY THE NATIVES. THESE STATIONS ARE LOCATED IN THE CENTER OF TIMBER TRACTS, AND FROM THEM RADIATE ROADS OR SMALL RAILWAY LINES INTO THE FOREST.



BIG QUEBRACHO LOGS GATHERED IN "THE CHACO."

It should be noticed that these logs have had the bark removed, and are serviceable either for tanning extract or for sleepers. If logs are felled close to a factory, every particle of the wood may be utilized for the extract.

splendid polish. The Argentine railway companies, which now finish a considerable proportion of their really fine ordinary, dining and sleeping cars, have found quebracho to have notable advantages over other woods for both strengthening and decorative purposes. Indeed, a demand for many other kinds of native timber, hitherto scarcely considered for building and cabinet-making, is spreading rapidly. It has been discovered that such are more suited to the climate and other conditions of the country than the foreign woods hitherto imported for these purposes."

If Argentina shall awaken to the necessity of soon protecting her splendid northern forests against the ravages of the money-mad corporations, she will place herself among the progressive nations. As the matter stands today, over \$10,000,000 worth of quebracho, in logs and extract, is being exported—about \$1,000,000 more of timber than of tannin. The logs are used chiefly for railway sleepers, fence posts, paving blocks and fuel, and of late years from

sixty to ninety per cent. of the timber exports have gone to the United Kingdom. Formerly Germany was the largest market for the extract, but the heavy import duties imposed on it have almost barred it from that country. For some years the United States has been getting about fifty per cent. of the tannin, whose exports amounted to 75,000 tons in 1912.

The manufacture of the quebracho tannin is conducted in numerous little factories in the forests of the Chaco region and the adjoining provinces of Santa Fe and Santiago del Estero, and as one ton of extract represents four tons of logs, the freight profits of the railroads are considerably reduced by this transformation. The factories are mostly located in the province of Santa Fe. It is estimated that the annual timber products of these three great forest districts of the north are divided as follows: Santiago, 3,600,000 railway sleepers, 1,800,000 fence posts (chiefly quebracho), and 310,000 tons of quebracho logs; Santa Fe, 490,000 tons of



MODE OF TRANSPORT BETWEEN THE OLDER WAGON AND THE NEWER RAILWAY.  
BEFORE THE QUEBRACHO INDUSTRY HAD ASSUMED ITS PRESENT PROPORTIONS IT WAS THOUGHT A VERY PROGRESSIVE STEP TO LAY RAILS FOR TRACTION  
BY ANIMALS TO THE EDGE OF THE FOREST.





THE BARK OF THE QUEBRACHO TREE.

The workman always tries the tree, if it is to be used for its tanning extract, by testing the thickness of the bark and sap wood. If the sap wood is too thick (1½ inches or more), the tree is spared, because it involves too high a labor cost to cut down a tree having proportionately so small a trunk. As neither bark nor sap wood contain much tannin, and as these coverings are always removed before a log is shipped, it is cheaper to search for trees of greater yield.

logs, and the territory of the Chaco, 45,000 tons of logs.

The northernmost forests of Argentina have also extensive belts of *lignum vitae*, or Brazil wood, whose solid and ornamental qualities have been utilized in so many ways. The southern districts of the republic, covering what are often called the Patagonian savannahs, carry oak, cypress and other woods which go into wine casks, furniture and interior woodwork.

But the quebracho forests of the north and northeast remain by far the country's most valued supply of hardwoods, and upon their conservation will rest Argentina's future as a nation which is capable of learning from the experience of others.

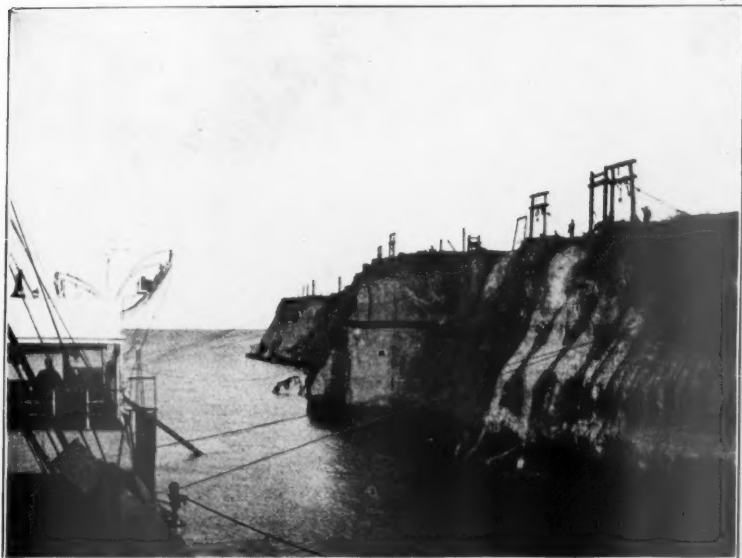
Within the past decade the amount of logs exported has increased from 245,000 tons to 445,000, and of extract, from 9,000 to 84,000. In this great land of forests and glades, rising from the Parana river toward the northwest,

some 300 saw mills (*aserraderos*) and extract factories are eating out its vitals, backed by 25,000,000 gold dollars of capital and \$45,000,000 of sales. The largest company employs 4,000 or 5,000 workmen in getting out the timber and transporting it to the saw mills and extract factories.

The greater proportion of the population of the quebracho country are *Correntinos*, a mixed race of the native *Guarani* Indians and the whites of all nations. The Chaco, or more northern part of this forestal district, is a plain inclined toward the southeast and the Parana river, but it is also a land of forests and solemn glades—a sort of Kentucky—a dark and bloody battleground long contested by the Spaniards, the Argentines and the Indians, and large tracts of which are still unexplored and held by primitive owners. The Chaco Indians have been the warriors of their race in Argentina, and the *Tobas*, still half naked and armed with wooden



A QUEBRACHO TRAIN APPROACHING ITS DESTINATION.  
THE TERMINUS OF MANY RAILWAYS IN THE CHACO IS AT RIVER NAVIGATION. HERE THE TRAIN UNLOADS ITS BURDEN INTO OCEAN-GOING VESSELS, FOR  
SOME DESTINATION OVER SEA.



LOADING QUEBRACHO FROM A HIGH RIVER BANK TO AN OCEAN-GOING STEAMER.

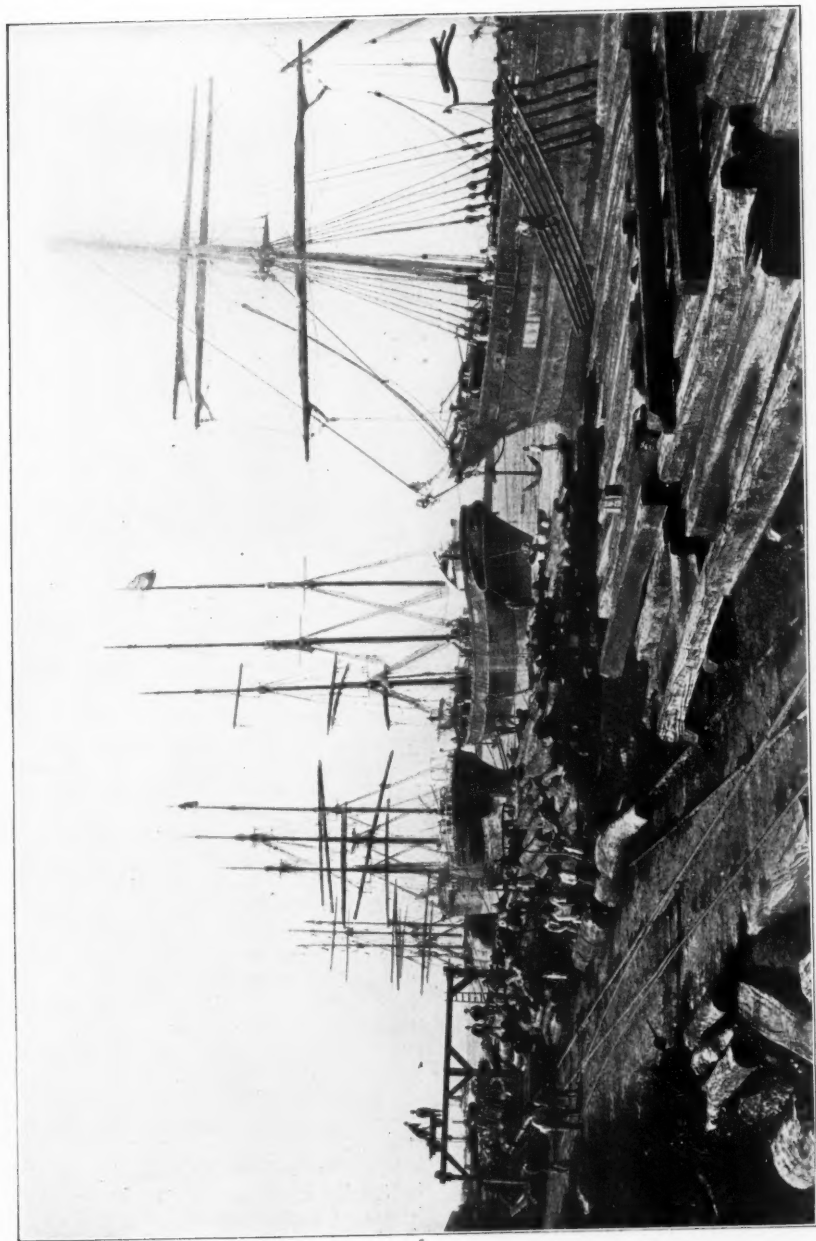
On the Paraná River, near Rosario, anchorage is found for steamers of considerable draft, but special apparatus is employed to get the logs on board. They are first lowered to the stream by wire rigging and then hoisted to the deck.

lance and bamboo bow, are responsible for the line of forts which stretch along the northern frontier. Farther away from civilization, their costume consists of a few tufts of ostrich and parrot feathers, or of a white linen head-dress patterned after the ancient helmet of the Peruvian Incas. The stone axe is there in common use, and in many districts fire is still produced by friction. As the fringe of civilization is touched by the Chaco Indians, they add bag loincloths to their feather or linen head-dresses, and those who come down from the wilds to work in the forests or sugar plantations even don the blouse, wide trousers, broad-brimmed hat and flowing colored tie of the Gaucho or Italian peon.

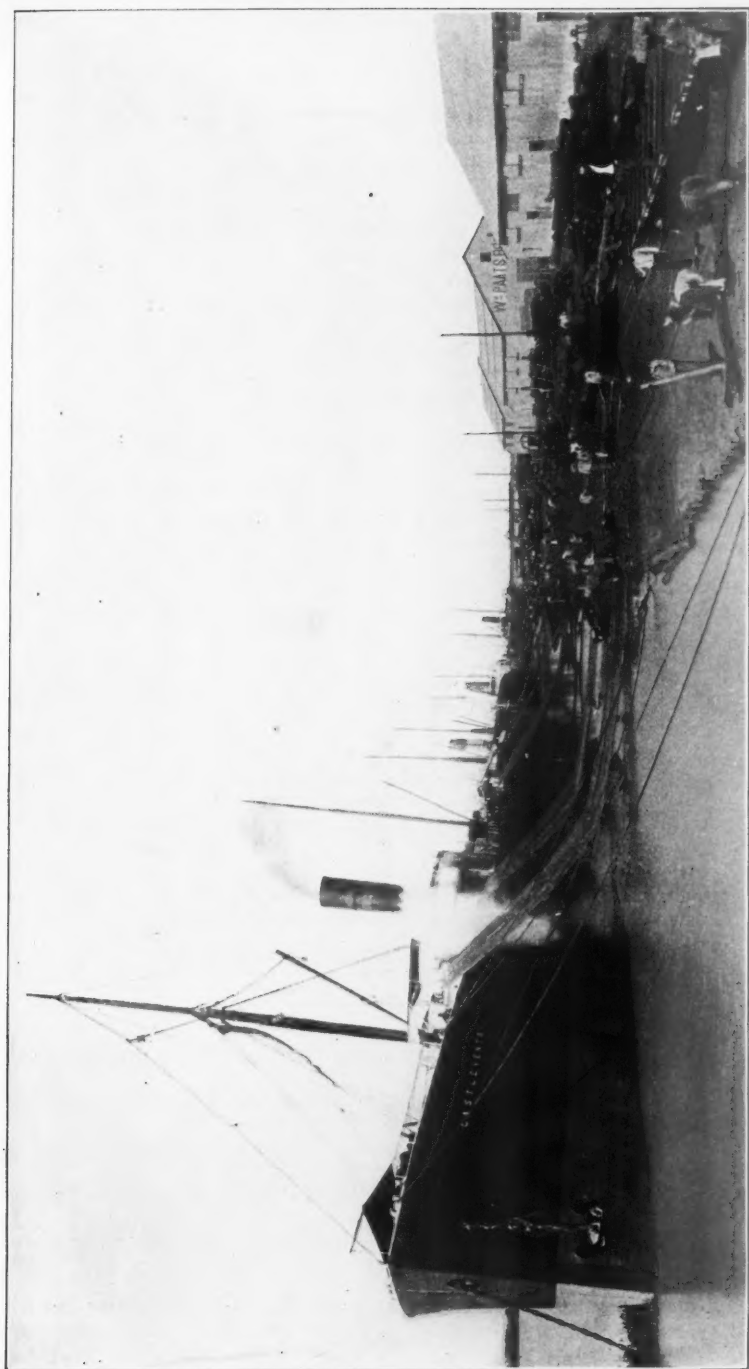
The cultivation of cane and the manufacture of sugar are prosecuted over a large extent of northern and north-western Argentina, and in these industries several thousand Chaco Indians and mixed Correntinos are employed every year as unskilled laborers. Many more work in the quebracho forests.

At the end of the sugar season these savage workmen will return to their homes in the Chaco country, travelling sometimes four or five hundred miles over mountains and through swamps and forests. They will then fell the quebracho trees on the banks of the rivers and streams, bind them into rafts with lighter woods beneath as floating buoys, get out fence posts and sleepers and assist in preparing the red quebracho for the manufacture of the tannin extract. Another hardwood tree which the Indians and semi-Indians help to get into commercial form is the algarrobo. It goes into street paving (as does the quebracho), its beany fruit makes good fodder, and a liquor is distilled from it which is the source of many a fierce headache to the Chaco man and woman.

The management of these hardwood industries is chiefly in the hands and brains of Europeans of Latin and German stock, with a threatened incursion by capitalists of the United States. The Farquhar syndicate, a powerful combi-



LOCAL PORTS FOR QUEBRACHO TRAFFIC ON THE RIVER PARANA.



QUEBRACHO LOGS GOING TO EUROPE.  
FROM SEVERAL POINTS ON THE PARANA RIVER LOADING IS A VERY SIMPLE PERFORMANCE. THE RAILWAY BRINGS THEM TO THE WATERSIDE, AND THE ENGINES  
ON THE STEAMER HAUL THEM ON BOARD ACROSS SKIDS RESTING AGAINST THE BANKS.

nation of New York moneyed men, is solidly intrenched in Paraguay and southwestern Brazil—another great Chaco, or Indian country—and is making ceaseless attempts to penetrate the quebracho region of Argentina.

With the rapid extension of railroads throughout the forestal regions of this section of southern South America, the most serious drawback to the exploitation of their riches is being removed. When the trees to be felled are away from the water courses, cattle must haul the heavy logs through the dense forests. Both cattle and men require fresh water, or they cannot work.

On the other hand, the land bordering the streams and rivers is generally swampy and subject to overflows, and there are many rapids to be overcome in the best of the water courses. Rafting is therefore especially difficult, and the navigation companies, with their freight steamers and schooners, as well as the few railways in the territory, have taken advantage of the quebracho lumberman and extract manufacturer to charge exorbitant rates for transportation. The extension of trunk lines of railway into the forest area, and the completion of the links which have brought it into touch with Buenos Aires, the seaboard and the world's markets, is so stimulating the industries of the country that the denudation of the timber lands should be, more than ever, a matter of present concern. With the fair protec-

tion of the forests, and consequent conservation of natural supplies of water, many sections of the country could well be devoted to live stock and the cultivation of wheat, cotton, sugar and tobacco. But if the land is completely striped of its forests, and no provision be made for future growths, the coming generation will furnish another hard example of the cruel saddling of unnecessary burdens on the shoulders of unborn sons and daughters of the soil. In the case of the quebracho forests of Argentina, this seems especially hard-hearted, since the natural stock can be replaced in twenty or thirty years—an advantage seldom offered by hardwood as valuable as this.

It might even be suggested that the leather manufacturers of the United States, for the good of their sons and those who follow them in their industrial life, should urge upon the governments of South America in whose domains lie the forests of quebracho, the desirability of the restoration of denuded tracts, knowing, as they do, that the hemlock bark of their own woods has long since proved inadequate for their tannin demands upon it. In our land, the denuded hemlock forests have been largely replaced by other native trees and given over irrevocably to farms, villages and cities. In Argentina and Paraguay, comparatively undeveloped, the problem is simple as well as urgent.

\*Photographs in this article by courtesy of the Pan-American Union.

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*Canada has 23 million acres in timber reserves, as compared with 187 million acres in the national forests of the United States.*

*Apple wood is the favorite material for ordinary saw handles, and some goes into so-called brier pipes.*

*New Jersey has a timbered area of about two million acres, on which the timber is worth about \$8,500,000 on the stump. It is mainly valuable for cordwood.*

*Many of the forest fires attributed to railroads are caused not by sparks from locomotives, but by cigar and cigarette butts thrown from smoking-car windows.*

*Port Orford cedar of the Pacific coast, recently tried as a substitute for English willow in the manufacture of artificial limbs, has been found unsatisfactory. While it is light enough, it is too coarse and brittle.*

*As an experiment, the supervisor of the Beaverhead national forest is stripping the bark from the bases of a number of lodgepole pine trees at various periods before they are to be cut for telephone poles. This girdling causes the trees to exude resin, and it is desired to find what effect this may have as a servative treatment for the poles.*



## FORESTRY ON THE COUNTRY ESTATE

By WARREN H. MILLER, M. F.

*Editor Field and Stream*

### IV. TREE TROUBLES

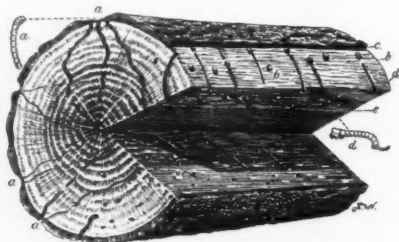
IN THE woodlands of a country estate owner, forestry partakes of many of the characteristics of park culture, as opposed to lumbering, in that the individual tree will have more care bestowed upon it and more money spent to save it if it is ailing than the lumberman could ever afford to spend. To him a tree attacked by borers or caterpillars is just non-merchantable stock, to be left standing or else used for skidways or construction work. To the estate owner, however, his chestnuts, hickories, pines, hemlocks, oaks and maples are the glories of his forest, and he will go to considerable expense to save a fine specimen, knowing well that if it dies he will not live to see it replaced by another like it.

These lines are therefore written more for the man who proposes to keep every fine tree in his forest thriving and healthful, than for the commercial forester who is mainly concerned with exploiting the timber. The usual forest remedy for most insect and fungus epidemics is to cut down and sell at once all the infected trees, also cutting down and leaving trap trees, which are forthwith burnt at the proper time to destroy the insect life they contain. Such a course would at once deprive the man owning a small tract of woodland of a large number of the trees which form a noticeable part of his forest, and which could ill be spared without rendering the place unsightly and leaving many dangerous gaps in the forest cover. For him, then, the spray and tree-surgery methods, in order to save and keep standing the fine growth that he already has.

In general, the best way to reduce tree troubles is to put your forest in a condition of maximum health, with the full complement of bird, animal and insect life which nature had ordained and maintained for thousands of centuries before tree troubles were ever

thought of. With the approach of civilization, the settlement of country, the growth of railroads, the killing off of our song birds, and the introduction of foreign insect life for which our own forest régime had no specific remedy, the tree troubles in our forests multiplied fast, and millions of dollars have been spent in artificial methods of restoring Nature's balance and trying to save our native trees from utter destruction. With the passing of the birds went our great feathered army of tree cleaners; with the introduction of the railroad and the factory came vast clouds of black soot, tainting the air and clogging up the respiration of our tree leaves, so that it is almost impossible to travel along the right of way of any big commuting railroad and see anything but dead and dying trees, killed by the train soot. And then, in the irony of fate, while it has proven impossible to make imported silk worm moths and other valuable insects thrive here, the harmful sorts, such as the gypsy and browntailed moths, increase and multiply here wholesale! To restore the original plan on which Mother Nature got along comfortably enough, the owner will see to it that a big, thriving bird colony is attracted to his forest, by bird houses, feeding, and rigid protection; that the forest is cleaned and thinned so as to promote vigorous growth in his trees; that spraying apparatus is used on infected trees too valuable to be cut down, and that parasites are imported, under directions of the U. S. Bureau of Agriculture, to fight insect epidemics. He will need all these resources to insure a fine forest growth, for, while Nature had a vast amount of decayed wood to contend with, man today has constant invasions from without his premises of every sort of fungus and insect wave which sweeps over the country, which more than balance the advantage gained by having a clean

forest. Insects and fungus will not as a rule attack healthy, living trees, but, when an invasion comes, there is not enough recently killed timber to go around, so that the insects concentrate their attacks on a healthy tree and kill it, with the object of attaining more dead wood to operate in. And, with the leaf-chewing varieties, the healthier the tree is, the better victim it makes.



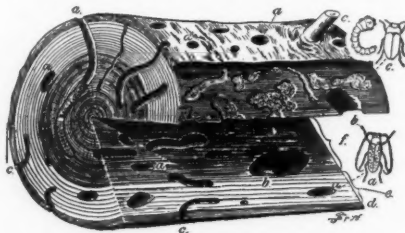
WORK OF TIMBER WORMS IN OAK.  
(a) OAK TIMBER WORM; (d) SAP TIMBER WORM.

The part the birds play in keeping down insects is enormous. For instance, take the little green inch-worm which we are wont to regard as a harmless sort of creature, principally engaged in measuring one for a new suit. To the forester he is known by the sinister name of canker worm, for he is the dread foe of all tree life, absolutely voracious in his attacks on all foliage, and denuding a tree of every leaf it has got, if given a chance. Yet one little vireo, nesting nearby, will find and eat hundreds of him in a single day. So will the harmless little garter snake, who performs for the bush life of the forest the same service that the birds do for the tree life. Nature has always kept down our American canker worm species within the limits of furnishing food for birds, with a reasonable amount of leaves supplied for the continuation of the canker worm family, but, with the birds gone, this restriction is removed and there seems to be no limit to the canker worm but the blue sky!

In the same way the woodpecker tribe have always kept the borers within reasonable bounds. All the sap borers work just under the bark, making big galleries through the cambium layer, and cutting all the sap fibres, so that

the sap flows to their precious offspring instead of feeding the tree, and by the time they have girdled a tree completely there is nothing for it but death to the latter—usually two seasons of borers will suffice to kill a perfectly healthy tree that has taken fifty years to reach its present stage of maturity. The woodpeckers, nuthatches, creepers *et al.* used to go over every tree carefully, listening for the borers at work and tapping the bark for hollow spots, and when they left a tree every borer on it had been found and eaten, to say nothing of a few million cocoons and dormant insects under the crevices in the bark. Nowadays, with one woodpecker to a hundred acres of forest, man has to do the principal fighting, and his only remedy is to cut down the tree or else make a woodpecker of himself and go over the infected tree with an oil can and a hatchet, squirting kerosene oil into the borer galleries under the bark. One remedy is worse than the disease, except that it may save the remaining trees, and the other is pretty expensive, but worth trying in the case of a fine, large tree, which used to send down a bushel of hickory nuts every season.

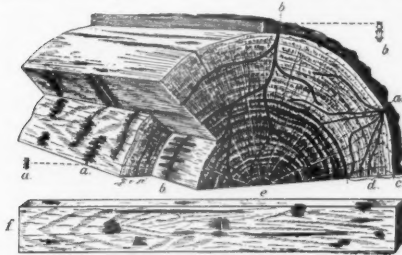
Do not get the idea from the above



WORK OF PINE BORERS.  
(a) ROUNDHEADED BORER, (c) FLATHEADED BORER,  
LARVAE AND ADULT BEETLE.

that all our forests are necessarily going to the bow-wows; far from it. Unless you are located near large cities or along heavily travelled railroads, the bulk of your forest will be healthy if properly managed. In the forest of Interlaken, where the writer lives, we have about three hundred acres of woodland, mostly white oaks, red maples, sweet and sour gums, chestnut oaks and some pine,

chestnut and hickory. We did not have the blight, nor have we had any special insect epidemics, and we have more than our share of birds, for there seem to be as many here every summer as there used to be twenty years ago in the suburban towns much nearer New York than we are. Every Appalachian species is well represented, and one can hear the quail whistling in the woods



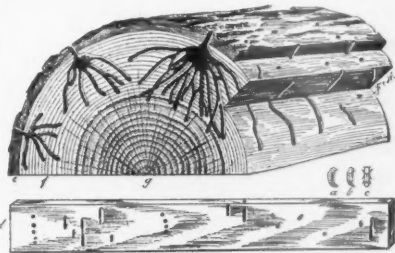
AMBROSIA BEETLES IN OAK.

(a) *MONARTHUS* MALE AND HIS WORK; (b) *PLATYPUS COMPOSITUS* AND GALLERIES.

any summer morning, before the day noises have begun to drown out all the sweet, quiet woods sounds.

But insect, fungus, fire and light problems will occur, and are continually coming up in any forest estate, and the only way to avoid suffering from them is to have the equipment and fight them vigorously until you have the mastery. Beginning with the first two, anything that chews leaves can be combated with a poison spray, of which arsenate of lead is the best, as it sticks to the foliage in spite of showers that would wash off Paris Green. For forest work, where there is no lumbering or logging road, nor fire lane down which a barrel spray wagon can be moved, the knapsack or bucket spray apparatus will answer. The cost runs from five to fifteen dollars, and a large barrel spray pump, with barrel and agitator attachment, will cost thirteen dollars. The standard solution will make fifty gallons of spray to the gallon of chemical, and the latter is all that need be carried, replenishing the water supply at the nearest brook. All sort of nozzle lengthening attachments, in the form of light pipes with a nozzle at one end and a hose connection at the other, for treat-

ing tall trees, can be had, as can also all the standard spray chemicals, all made up and only needing the addition of water, at any of the big seed houses. Several special nozzles for various types of spraying should also be provided, since such sprays as Bordeaux mixture require occasional degorging. Certain caterpillars of the European species our native birds will not touch, and for these spraying is the only remedy (but it is effective), and for all the fungus diseases the Bordeaux mixture spray is essential. For scales and lice the whale oil and kerosene emulsion sprays will be needed, such as for the April spraying of your silver maples for cottony maple scale, and oyster shell scale on poplars and hard maples. Bordeaux mixture is the best remedy yet discovered for blight on chestnuts, slime flux on all large gaping wounds in the cambium layer of any tree, and anthracnose in sycamores and oaks. In these latter trees the affected twigs had better be pruned off and burnt in the early spring, which brings us to another much-needed tool, the pruning hook and tree saw, both of



AMBROSIA BEETLES IN HICKORY.

a, b, and c, Hickory borer, larvae, pupa and adult. The remedy is to cut off and burn dead all infected branches and inject kerosene oil into the galleries on the tree trunk.

which come with twelve foot or longer handles for forest tree work, the cost being about a dollar for each tool, or they can be bought combined in one tool for \$1.75. A couple of good extension ladders will also be needed, the thirty-foot size, costing around twelve dollars, being ample for nearly all forest work. In the fall there will be some cocoon cleaning to do, and the implement for



WINDTHROWN FIRS IN THE SHILWALD, ZURICH.

this is a wire tree brush, costing two dollars, which is attached to a long pole and manipulated from ground or extension ladder, depending upon the height of the tree infested with the little white cocoons, which will mean so much trouble for you the following spring if not brushed off and burnt.

Another weapon to fight forest enemies is the tar band. Many species, such as the canker worm and the elm leaf beetle have a continuous cycle of reproduction going on all summer, and a colony of them will camp out on a tree and ravage it of all its leaves if not headed off. After losing its first crop the poor tree tries to put out another, and usually does, but by the time they are grown a new generation of caterpillars will be on hand and this crop goes also. Another crop of leaves will sometimes put forth in September, but usually the tree is through for the year, and if the experience is repeated the next year, the tree dies from suffocation, for the leaves are what it breathes with. Spraying is, of course, one remedy; and the other is to prevent the ascent of the female moth full of eggs. Luckily she cannot fly in this state but must

crawl up the trunk to the branches, in the crevices of which she deposits her eggs. With plenty of birds about, these are cheerfully eaten and there's an end; but nowadays most of them hatch, and the voracious little larvae begin right off on the tender spring foliage. In two weeks they are full grown and let themselves down to the ground by spinning a long silk thread, which you have often seen them do, many of them being carried by the wind to infest other trees. After burying themselves in the ground they enter the pupa state, some species remaining dormant until next spring, some emerging as a moth in a month or so, when they immediately crawl up the tree again and start a new colony of worms. Most seed houses keep sticky band preparations already prepared, so that the forest estate owner with only a small patch of woodland need not bother with tar preparation on a large scale. I have seen forests in Germany where for miles every tree was banded, all along the borders and into the forest about fifty or a hundred feet, the idea being to keep out these crawlers by catching them on the border trees. These bands should

go on during the first warm days of early spring. Any tree attacked by canker worms, elm beetles, pine and spruce beetles; gypsy, browntail and tussock moths, and ants, should be so banded.

One more mechanical weapon, the tree torch, for tent caterpillars and cocoons. The iron basket with asbestos filler costs twenty-five cents and can be attached to any sort of pole cut in the forest. Saturate with kerosene oil and pass quickly along twigs and branches where there are cocoons or webs of the tent caterpillar. A heat of 140 degrees Fahrenheit reached in the cambium layer of any twig or green branch will ruin it, but, as the specific heat of sap is nearly as large as that of water, the flame can hover for nearly a minute if need be in any one locality without raising the sap temperature to that point. Bark injury, with its attendant fungus troubles, is more to be guarded against in the use of the torch than sap injury, and on thin bark, as a rule, ten seconds of flame will kill any pupa or burn up the cocoon, and is long enough for the torch to remain.

Lichens, mushrooms, toadstools and fungi will attack any dead or decaying tree, and any exposed wood or wound on a live one. As soon as the fungus has effected a lodgement, the mycelium or, as it were, root fibres of the fungus, fight their way down into the wood, rotting it as they go, and what was at first a minor injury soon becomes a bad wound. The remedy for all this is clean cutting the wound, disinfecting with one of the standard formaldehyde solutions sold at any seed store, and painting with tar or white lead paint, the latter of course being colorable to any shade desired, as in house painting. The living part of the tree is the sap layer only; one should get to regard the heart wood as a carpentered structure and treat it accordingly. How would you go about stopping rot in your house trim, your barn timbers or your fence posts? By cutting down to fresh wood and repainting, of course—and that is really all there is to tree surgery. Be sure and go deep enough to get out all infected wood, or you might

as well not start at all, and if the resulting work will leave a rain pocket, fill with Portland cement mortar, two parts sand to one cement, and cap it off with neat cement or one-and-one mixture. In a big forest much of this sort of work is entirely unnecessary, for nature is doing it very well herself. All the shade-killed branches are self-pruned by the fact that the rot begins



COTTONWOODS INFECTED WITH BORERS.

right close to the trunk, and the wind soon breaks off the dead branch. Year by year the cambium layer closes over on the decayed stub, until finally the closure is complete. After that the sap layer flows completely over the spot, and we get the well-known bark knob, so common on maple, elm, dogwood, cherry and gum trees. With large limbs, however, which from one cause or another have been shade-killed and later break off, the fungus attack is likely to get a firm foothold, and as the closure cannot be made by the bark growth on account of the size of the hole,



the rot continues from year to year until the whole heart wood may be rotted. In such cases the tree surgeon gets to work and saves the tree for many years of usefulness and vigor, for, while a tree rotten at the heart will be as healthy and vigorous as ever in its growth, it is mechanically weak, subject to insect and fungus attack and likely to be windthrown any time.

Fire is an enemy that will not bother the owner of a hardwood forest to any great extent, except in the matter of ground and brush fires, but as soon as he plants or assembles a forest of evergreens he is in danger of fatal crown fires from almost the first year. During the early years of a plantation the danger is of a brush or field fire, which of course would kill the young transplants; and after the sixth year the crowns get to such a size as to easily communicate a fire even on six foot spacing. Fire and logging lanes should be left every four hundred feet in such a forest, and these should be twenty-five or thirty feet wide during the first twenty years of the life of the forest, and later widened to 50 and 100 feet. In planting for a twenty-five-foot fire lane, leave forty-five feet between the border transplants to allow for side growth into the lane from both sides, or branches, which will easily attain ten feet in length in the first fifteen years. A fifty-foot European larch border around each section is a good thing, not only because it is the best way to grow such an intolerant tree as larch, but because it aids materially in the effectiveness of a fire lane in a forest of spruce or pine, the larches being less vulnerable to crown fires.

In the hardwood woodlot the fire most often met with is the ordinary leaf or brush fire. These seem harmless enough, and might even be suggested as a means of cleaning out underbrush cheaply, but as a matter of fact they are extremely harmful. At first nothing unusual is apparent but some blackened bark at the stumps of the trees. If the bark is thick and the tree old, no particular harm has been done, but the saplings of three to six inches diameter of all species will have been found to be

badly scalded. In a year or so the bark spalls off, showing bare heart wood underneath; the tree has only about half the original number of sap fibres available to feed it and therefore cannot circulate its sap from roots to crown freely, and soon becomes peaked and diseased. In time it may heal up the scar, grow bark over it and put down some roots on this side again; more often a set of coppice shoots will start from the root collet, and instead of one tree you have a spindly sapling and a lot of outlaw shoots, which fight with it for light and moisture. We have one patch of forest in Interlaken, burnt over by one of these "harmless" ground fires, in which every single sapling shows a scar as big as a saucer, and on the big trees some of them exhibit a scald the size of a dinner plate. They will all be taken out in time; at present we have planted some three-inch nursery white ashes and liriiodendrons here and there in the patch, which will be the dominant trees in a few years, and then the burnt growth will be taken out entirely as none of it will ever make good, sound trees. Wherefore, prohibit brush fires in your woodlands, and be keen to put out any accidental ones. Very good apparatus for the purpose, consisting of asbestos fire shields, pack-sack fire extinguishers, etc., are now being made commercially so there is no necessity to go to the trouble of home-made equipment. I have already published what can be done with dynamite in fire fighting, and would advise reserving a set of tree-planting cartridges, all wired up for use in emergency brush fires, as they often occur when sufficient help cannot be gotten to the scene of the brush fire quickly enough to save many valuable saplings. I knew one leaf fire that covered half an acre of ground in ten minutes.

The problem of light in the forest is a fascinating one, and any forest owner can get a good deal of pleasure out of the study, using an ordinary photographic actinometer to make his own measurements. My good friend, Raphael Zon, of the U. S. Forest Service, has published an excellent bulletin on the subject, which everyone should read to



get posted in the matter (Bulletin 92, Forest Service). His measurements are all in Weisner's "Isolator" standards, but a good enough practical substitute can be made by measuring full daylight in your locality on bright summer days with the photographer's actinometer, and then taking the average per cent. of full daylight with this instrument in any locality you propose to under plant. A table of our more common eastern species, with their tolerance expressed in terms of full daylight, would be valuable. The subject is of importance, for many species will thrive when young in a light which they would die in after middle age, and it is well to take light values in different localities before finally deciding on the species of tree to plant there, after due consideration has been had of water, soil, and surrounding general conditions. With us

in Southern Jersey, the light intensity problem is not so very serious, for the general diffused daylight is so strong that white pine will grow directly under a big chestnut oak and seemingly get to maturity without any particular trouble—we have several of them 35 years and over growing under such conditions. But in more northern localities, where the winters are severe and the total yearly daylight much less, light measurements should be taken. In the brief limits of this article the subject can be barely mentioned; I believe that with a thorough comprehension of all that is said in Zon's bulletin, a woodlot owner could make with an ordinary pocket actinometer, costing fifty cents, measurements sufficiently accurate enough for planting purposes.

(To be Continued.)

## A MAN TO A TREE

By GERTRUDE CORNWELL HOPKINS

Stripped clean to meet the blast you  
stand,  
No tender leaves to shred;  
Your thousand fingers grip the earth  
And all the rest seems dead.

Your life drawn back and hid beneath  
The cool, thick, silent crust—  
No blithe joys now of upper air,  
Your spirit dwells in dust.

I'm like you, Tree; this is the time  
I'm stript to bare life's needs,  
For when a branch is full o' sap,  
And bent or broke—it bleeds.

I have to see some grim days past,  
To play this game straight through;  
It's time for endurance, not for mirth  
With me, the same as you.

But I'm not set to stay like this,  
So stiff and stark and numb:  
A man should be as sure as you;  
His good green time will come

When he can spread in the warm air,  
Stick small, new leaflets out,  
And add a grace or two to life—  
He doesn't have to doubt.

Yet—I need more than you do, Tree;  
I can't stand still and wait,  
Secure that all the good that's mine  
Will come to me like fate:

I have to stir around a bit,  
Find what belongs to me—  
O, I'm gnarled and roughed and  
strained and hard  
But—just you wait, Old Tree!

*Lumbermen and others have shown recently that only 40% of the trees cut in the forests of this country are used for lumber. The remaining 60% represents pure waste as high stumps and tops either left to rot in the woods or as slabs consumed in the burner or slash piles at the mill. In Germany about 95% of every tree grown in the forests is used. Practically nothing from the forest is allowed to go to waste; even the stumps are grubbed out and the twigs and branches tied up into faggots for fuel.*

## ONE VIEW OF THE FOREST RANGER

By PAUL G. REDINGTON

*Forest Supervisor, Sierra National Forest*

ALREADY much has been written about the forest ranger—some good poetry—more bad; some true-to-life fiction, more that widely misses the mark. To those people who have never come in contact with the forest ranger—easterners and those of the west who do not frequent his habitat—his life is one of romance, adventure, danger. To them he is a mighty man of brawn, clad in the stage habilaments of a frontiersman or cowboy, superbly mounted, travelling in a country where heretofore "the hand of man has never set foot;" classes in the same category as a member of the Northwest Mounted Police of Canada; an officer of a great government, clothed with the stern and unyielding authority of the law as he does his business with the grazer, the miner, the lumberman and the settler. This poorly drawn picture of a forest ranger has been displayed before the eyes of many people by noted authors and writers of fiction and one cannot blame the uninitiated if he fails utterly to comprehend that commonplace and hard, grinding work also are to be found in the daily life of a ranger; that this government officer seldom has to resort to force to carry out the law under which he works; that he is the friend and not the enemy of the men with whom he transacts business; that he is a respected member of a community; in most cases a man with a family, with the cares in this respect of the average American citizen on his shoulders; that he does his work from a sense of duty and because he wants to see it well done rather than because of arbitrary instructions of a superior officer. These people fail to appreciate—because they do not know—that a large part of the work of the ranger is of his own initiating; that within certain limits he plans the greater part of the work which is to keep him busy, unhampered by dictation from any

higher authority. There will always be romance in the ranger's life, and it is safe to say that his work and his life will furnish the basis for many of the really readable novels of the future. I have often thought of what a chance any man in the field force of the Service, blessed with the knack of throwing together a good novel, has of putting the forest ranger into a story that would deal with the romantic and the humorous, the humorous and the pathetic; a story that would give to the public a clearer idea of the real work of the average ranger than has been conveyed in the writings hitherto. How many little anecdotes each one of us knows, which, if put into properly embellished English, would make one of the most interesting groups of short stories in existence. But I am going to sidetrack this phase of a many-sided subject, and try to tell just what I think of the forest ranger and his future as viewed from a few short but pleasant years of contact with him and from the angle of a good many different positions.

The forest ranger is, though he may not fully appreciate it, the foundation of the Forest Service, on which the vast establishment absolutely depends for support. He is the real forester in this great government machine. If not, in technical parlance, now, he will be not many years in the future. The practice of the profession of forestry must naturally be based on, first, a chance for the largest possible amount of field work, and, second, on observation; assuming, of course, that the man practising it has had sufficient of the theory of forestry to allow him to do proper and accurate work in the woods. As I say, the work must be done in the field where results can be watched for and studied. This cannot be done by an administrative officer of the Service, who necessarily has to devote a great bulk of his time to office work in connection with proper



RANGERS SURVEYING FOREST HOMESTEAD TRACT, SIERRA NATIONAL FOREST.  
THESE MEN ARE RUNNING THE BOUNDARIES OF A QUARTER SECTION WHICH IS TO BE OCCUPIED BY A HOMESTEADER. THIS LAND HAS BEEN ELIMINATED FROM  
THE FOREST RESERVE AFTER OFFICIALS OF THE SERVICE HAVE DETERMINED IT IS BETTER FITTED FOR AGRICULTURE THAN FOR FOREST GROWTH.

organization, and also because such an administrative officer, even though in the field for quite a portion of his time, has generally a large territory to cover, and his work cannot be intensive. It now happens that the greater number of the higher administrative offices in the Service are filled by men who have had, considering the chances in this country, a good technical education, but this is no criterion by which the future should be judged. These men of whom I speak may be classed as the missionaries of the forestry profession in the United States. Their work has been one of education and of organization and the work they have done in the past five years along these lines will, I think, always stand out as a distinct and a remarkable achievement; but these results could not have been as successful as they assuredly have been unless these missionaries had found men willing to be educated in the fundamentals of forestry and also willing to sacrifice a larger gain for the satisfaction of accomplishing something for the general public service. The rangers constitute this latter class of men to whom I refer, and it would be difficult to frame a tribute which would convey the credit due these men. They have worked under exasperating difficulties, and they do not, in most instances, appreciate what they have accomplished.

More and more it becomes apparent to me that to the man who wants to accomplish those things which are going to count in the organization and management of forest work, a position in the field is an absolute necessity. There will be no denial of my statement that the trend now is out of the office and into the woods, but some of the men who are taking this step now are a long way behind the rangers who have been in the woods for some time. As Inspector and later Associate District Forester in another district of the Service, I thought very often with envy of the Supervisor, since from that point of view it seemed to me that he was the man who was accomplishing things. Now, as Supervisor, the same feeling comes to me when I think about the rangers. As Supervisor, perhaps my judgment in

differing with a ranger on a piece of work must as a matter of organization be final, but unless I have been on the ground and know the conditions thoroughly, I never feel satisfied with the decision that has to reverse a ranger. To successfully conduct the work of a national forest, the Supervisor must depend almost to the last degree on his men in the field, for they are the men who are on the firing line and who are doing things.

Not many years from now our ranger districts, smaller in area considerably, will be in the charge of a forest ranger, who to successfully conduct the work within his district, is going to need a fundamental knowledge of technical forestry. The forest stations will be equipped with tree nurseries whence a supply of young trees can be transported quickly and safely to an area in need of trees, when natural reproduction has failed to seed up a logged or burned country; these stations will be equipped in many instances with instruments for recording all those climatic features that have such an influence on the growth of the forest trees. The stations will be dotted with experimental plots from which the technically educated ranger in charge will draw his conclusions on which to base his field work. This change I think the men have all seen coming, slowly perhaps but surely, but I do not believe any of them, who think they lack opportunities for obtaining knowledge for technical forestry, should become alarmed lest their positions are shortly going to be preempted by others. The rangers do not appreciate that they know a great deal about technical forestry, neither do they, I think, realize how tremendous an opportunity each one of them has to widely extend this knowledge of technical forestry by study, by reading, and, perhaps most important of all, by observation. Though it is hard for some to read and assimilate readily, it is possible for everyone, whether the opportunity of a higher education has been his or not, to benefit an hundred-fold by observation. Rangers are seeing those things in the woods that are necessary to the forester if he is going



FOREST RANGER REPAIRING A TELEPHONE LINE, SIERRA NATIONAL FOREST.  
THIS LINE CONNECTS A FIRE LOOKOUT STATION WITH THE RANGERS' HEADQUARTERS AND AN IMPORTANT PART OF THE RANGERS' WORK IS THE BUILDING AND  
MAINTAINING OF THESE LINES THROUGH THE FORESTS.

to endeavor to satisfactorily solve the forest problems to be found in this country. They have the best chance to study by observation the effects of fire on soil and reproduction. It is up to them to tell us how our methods of fire protection can be bettered; how we can bring about economy in the management of timber sales; how brush burning can best be done and why; what steps are necessary to bring about a better condition of the range. If the rangers can only appreciate it and keep the realization before them constantly, every one of the men has it within his power to advance to an appreciable degree the work to which he is devoting his time and thought. As a field man, a ranger has considerable advantage over the men who have been coached in theoretical methods of forestry at the school, where field work does not occupy a period proportionate with text books. It is up to the ranger to try his very best to get the theory to go along with the practice and experience that is his. The chances for obtaining a forestry education are so much better for the average man now than they were five years ago that we can scarcely prophesy what is going to happen in the next decade, while most of the men are still in the prime of life and able to take (partially at least) advantage of such opportunities. As I have said, most of the rangers have the fundamental principles of the field end of practical forestry well in hand. If those who have not had the opportunity before, can round this out by a short, comprehensive course in technical forestry, one of these days they can return to their districts secure in the knowledge that they are in the position to do the most valuable kind of work for the profession.

As time goes on, our substantial cabins will have been built, our telephone and trail systems completed; our grazing so adjusted as to run almost automatically each year; our current timber sale work well in hand, and then more time will be devoted by the rangers to the thousand and one forest

problems that the American forester has to solve. They will tell us how best we can check the erosion of our mountain parks; what grasses are going to best restore a depleted range; what body of timber needs to be marketed, and all the facts about how much can be cut each year; how much of the area should be reforested as it is cut; how much can be cut fifty years in the future; under what regulations the cutting should be done; what by-products can be obtained from the heretofore wasted portions of trees, and how are incipient insect attacks to be combated. They will be able to say whether or not our methods of forest mensuration are archaic, and just how they can be improved. They will be in charge of reconnaissance crews and will construct a working plan to the last detail for the territory within their districts. I am, of course, speaking for myself when I forecast this future. I know that the majority of experienced men in the Service agree in general with my views. I know that they will tell the men, as I have tried to, if government control of the forests of the western country is to continue, that there can be no great success or large accomplishment unless there is always at the front the forest ranger, conscientious, self-sacrificing, observing, doing things as the forest ranger of today is doing things.

He must remember, when the work drags and discouragements come, that without him and men like him, the Forest Service could not progress. His reward may not come in large remuneration or rapid advancement in rank, or in results actually seen by him, but it will most surely and quickly come in his own realization that he is a cognate part of a movement that touches the very foundations of human prosperity; of a movement that is altruistic, and one that has no tolerance for graft or meanness or selfishness, individual or corporate; his reward will come when he fully appreciates that he has done his best to help along the conservation movement, classed by many as the greatest of modern times.



## PROGRESS IN BRITISH COLUMBIA

By OVERTON WESTFELDT PRICE

**B** RITISH Columbia has already travelled, surely and very rapidly, far along the road which leads to forest conservation. That is important, since in British Columbia's forests is estimated to be over one-half the total timber stand of all Canada.

To what is British Columbia's progress in forestry due? To these three things as I see it. First, a very remarkable opportunity to make the provincial forests serve the provincial welfare; for while British Columbia possesses large agricultural and rich mineral resources, vast water powers and great fisheries, it is primarily a forest country. Second, after opportunity comes the man in William R. Ross, the Provincial Minister of Lands, who, with the strong support of the Premier, Sir Richard McBride, is carrying forward wisely and vigorously a remarkably progressive, clean-cut policy of land, forest and water conservation. Third in the list of predisposing causes for forestry in British Columbia, and also an absolutely essential one, comes a group of men like H. R. MacMillan, M. A. Grainger, R. E. Benedict and J. H. Lafon; men who have great zeal and great efficiency in forest work, and who are building up a forest branch which is like themselves.

This new forest branch is a distinctly vigorous infant. The toys with which it is playing happily and usefully are the forests of British Columbia. That makes quite an extensive puzzle picture, for British Columbia's forests cover one hundred and fifty million acres. This infant organization spent last year about \$350,000 and took in from rentals on timber held by lumbermen under lease from the government, "royalties" which means payments for stumpage, and from miscellaneous sources, about \$3,000,000, or a revenue of \$6.93 per capita for the entire population of the province.

Nor is this somewhat precocious youngster interested merely in present returns. It also goes in quite extensively

for forest fire protection and last year held, with a force of 320 men, the total forest fire damage in the entire province down to \$18,354, which, to put it mildly, is distinctly creditable to those 320 men. During the year also the forest branch completed its organization of twelve forest districts, each with a district forester in charge. It made an admirable beginning on logging inspection of 794 operations whose product aggregated one and one-third billion feet board measure, as well as great quantities of shingle bolts, piling, posts, mine props and poles. It made a notable beginning too, on permanent forest improvements, in the construction of nearly twelve hundred miles of trail and 360 miles of telephone line. To complete the tale merely of its more notable achievements, the forest branch has also developed a thriving little timber sale business, which last year comprised \$238,000 worth of timber sold, and a further \$147,000 worth advertised for sale. When the fact is recalled that the forest branch is not yet three years old, this progress is notable in forest history anywhere.

The next task before the branch is to put forestry into effect on all timber limits with fairness to the forests and to the lumbermen. That, as Mr. Ross, the Minister of Lands, announced in a recent speech, is the most important task of all; and he and his forest branch are facing it.

The recent act introduced by Mr. Ross for the adjustment of timber royalties is a great accomplishment. Without going into detail (for the act is available from the forest branch to any one who asks for it), I want merely to indicate what it accomplishes in fundamentals.

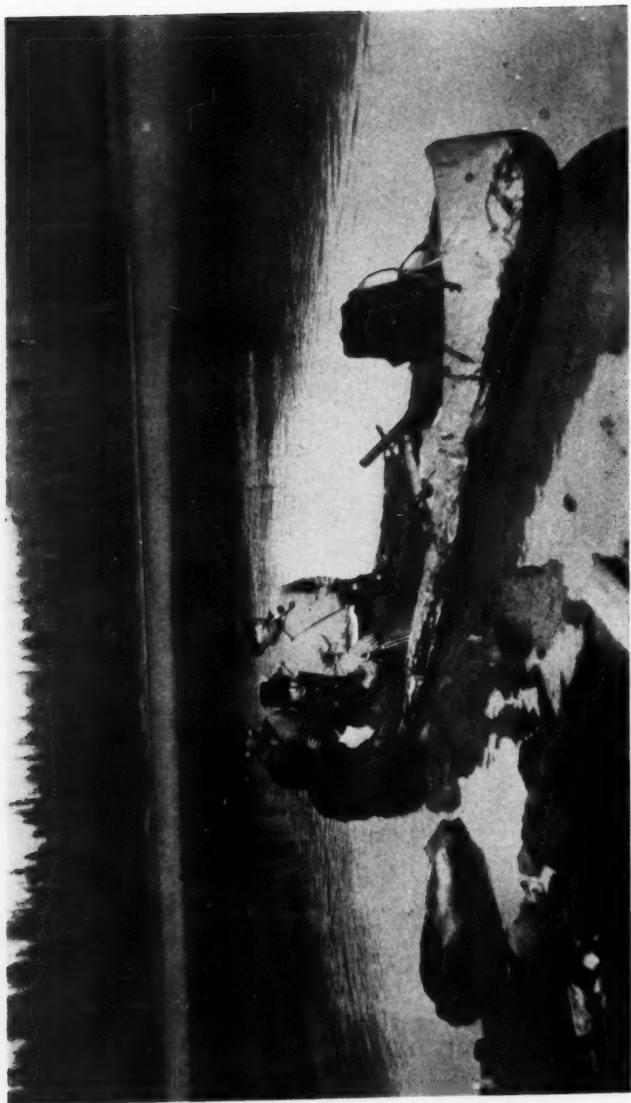
This act provides that royalties, now fifty cents, shall go up by fifty per cent on January 1, 1915, and there remain for five years. Then, in 1920, comes a readjustment, under which the government first determines the average mill



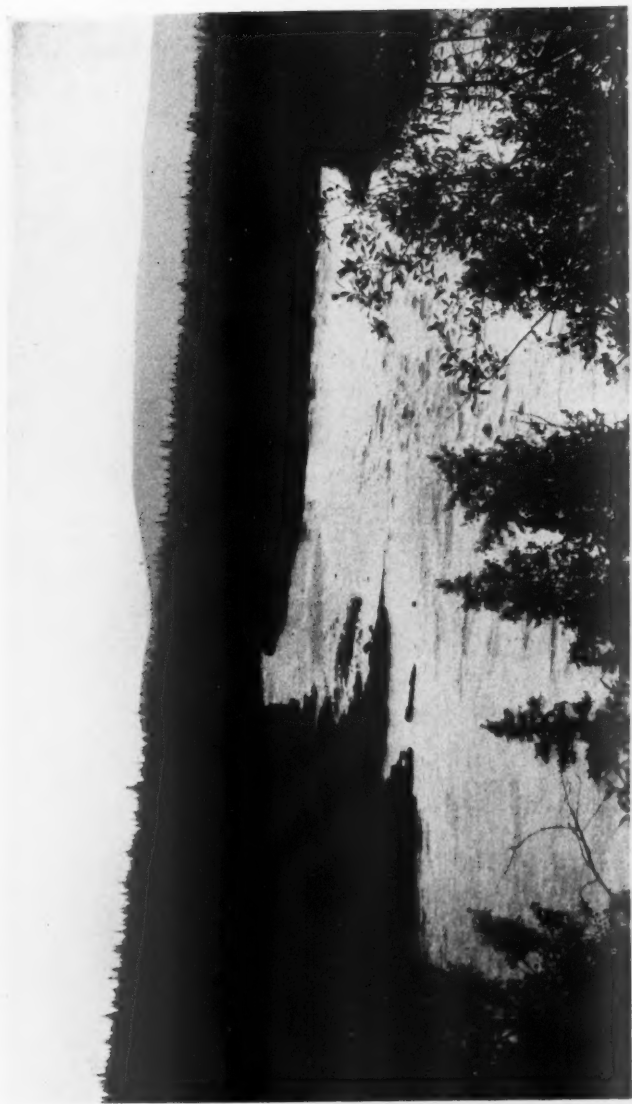
WHERE FOREST FIRES HAVE NOT RUN IN BRITISH COLUMBIA.



ON THE NAAS RIVER, IN NORTHERN BRITISH COLUMBIA.



AN INCIDENT OF FOREST RECONNAISSANCE IN BRITISH COLUMBIA.



BRITISH COLUMBIA HAS UNNUMBERED LAKES LIKE THIS.

run price of lumber for the last three years, and adds to the royalty for the next five-year period one-fourth of the excess above \$18.00 per thousand feet. At the end of every five years for six five-year periods the same process is renewed, the percentage of the price increment above a price of \$18.00 taken by the government in royalty rising gradually from twenty-five to forty per cent.

This means straight profit sharing between the public and the lumbermen. In revenue it means from forestry several times the present returns before the period of the act is ended. As a precedent it means to British Columbia true conservation, if the precedent be followed, as I firmly believe it will. It is precisely one of the great conservation principles for which Gifford Pinchot has been fighting and has been winning and goes on doing both, in the United States; and it is very gratifying to Americans that in his speech endorsing the Royalty Bill of Mr. Ross, the Premier referred to Gifford Pinchot as "that great conservation leader who possesses the rare combination of vision, leadership and common sense." The application of that principle to the other vast resources of British Columbia, such as water powers and minerals, will

make it, more nearly than any other government of which I know, the epitome of conservation principles, with the possible exception of Australia.

I do not mean, of course, to imply that the situation is absolutely roseate. Conservation confronts difficulties in British Columbia as it does elsewhere. But there is in that province an admirable combination of opportunity—for British Columbia owns nearly all the natural resources of British Columbia and the special interests do not—and of patriotic, farsighted men like Sir Richard McBride, Mr. Ross and Mr. Bowser, the Attorney General, in position of high trust. Such a combination is sure to get great results.

The way in which the United States Forest Service has, by friendly cooperation, lent its help to the new forest branch, is an exceedingly praiseworthy and productive thing. The forest branch cannot be a replica of the Forest Service, because it deals with different conditions under different laws; but the purpose of both organizations is to get the highest good for the greatest number from publicly owned forest resources, and there is and is always bound to be a constant and fruitful spirit of mutual help between them. That spirit is already active and at work.

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## CONFERENCE ON IRRIGATION

SECRETARY LANE has called a conference on the general subject of the irrigation of the arid West to meet in Denver on the 9th of April, and has requested the governors of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming, to send to this conference those who are interested in the further extension of irrigation in the West. This conference will be devoted especially to the consideration of

methods of cooperation between the States and the Federal Government, the building and managing of irrigation projects and in considering the ways and means of financing such work. Secretary Lane will be represented by several members of his staff, including those most familiar with irrigation matters, and invitations have also been extended to the representatives of financial interests interested in the flotation of irrigation bonds and to the representatives of Carey Act projects.



## DEDICATION OF A FORESTRY BUILDING

THE dedication of the forestry building of the New York State College of Agriculture at Cornell University on May 15 promises to be an occasion of great interest. The address of dedication is to be given by L. H. Bailey, former director of the College of Agriculture, at the opening of the program. Morning, afternoon and evening sessions have been arranged.

In the morning and afternoon the following additional speakers will be heard: J. S. Whipple, President of the New York State Forestry Association; C. M. Dow, Chairman of the Forestry Committee of the New York State Bankers' Association; F. L. Moore, President of the Empire State Forest Products Association; C. L. Pack, President of the National Conservation Congress; H. S. Drinker, President of the American Forestry Association; J. W. Toumey, Director of the Yale Forest School.

The evening session will be held in the assembly hall of the Main Agricultural Building, at which Henry S. Graves and Gifford Pinchot will be the speakers.

On Saturday morning, May 16, the Society of American Foresters will hold a meeting at which Alfred Gaskill, State Forester of New Jersey, Filibert Roth, Director of the Department of Forestry at the University of Michigan, and B. E. Fernow, President of the Society, will speak.

The directors of the American Forestry Association will also attend during the two days' exercises and at the same time will hold their spring meeting.

The program throughout follows one main topic, of interest to all, "The Lines

of Principal Effort in American Forestry for the Next Decade." The speakers will develop this subject from various standpoints, including the training of foresters, lumbering, making public opinion effective, national forest work, the national movement for forest conservation, state forestry in the east and in the middle west.

The Cornell Forestry Club has planned an excursion by boat to Taughannock Falls on Saturday afternoon and an informal dinner there.

Between the sessions of the dedication meeting, visitors will have an opportunity to visit buildings of the university and to inspect the new forestry building.

This building is located on the east side of the university campus, opposite Beebe Lake and Fall Creek Road. Its cost, including equipment, is \$120,000, which was appropriated by the State. It is one hundred and forty-two feet long and fifty-four feet wide. The distribution of principal rooms is as follows:

Ground floor: Wood technology laboratories, timber testing laboratory, locker room, freight room.

First floor: Offices, reading room, lecture and class room, mensuration and utilization laboratory.

Second floor: Silvicultural and dendrology laboratory, museum, herbarium, class rooms, draughting room.

Third floor: Laboratories for advanced students, forestry club room, camera and dark rooms.

Much interest has been shown in the dedication and a large attendance both from within and without the State is assured.

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*Sawdust is now becoming of sufficient value to ship it to points where it can be used for ice packing, stable bedding, stuffing for upholstery, packing glassware, for shipment of metals, crockery, etc. Sawdust is even used for the manufacture of gunpowder and in Europe it is compressed into briquettes and sold for fuel. A few plants have already been organized in this country for utilizing sawdust for briquettes. Slabs, edgings and tops are now being profitably converted into cooperage stock, broom and other handles, wood turnery, wooden dishes and novelties, dowels, furniture rounds, etc.*

*The stringent requirement of the Forest Service that all sheep be dipped before entering the national forests has practically eradicated scabies on those areas.*



FORESTRY BUILDING OF THE NEW YORK STATE COLLEGE OF AGRICULTURE AT CORNELL UNIVERSITY, ITHACA, N. Y., TO BE DEDICATED ON MAY 15.

## A NEW TYPE OF FIRE LINE

By M. A. BENEDICT

*Deputy Supervisor, Sierra National Forest*

A TIMBER famine in the next generation or two is a strong probability. The rapid depletion of the timber stand on private holdings is a clear prognosis of the grave situation which will confront this country a few decades hence. To partially meet the demands of the future, millions of acres of public land were set aside some years ago as National Forests, to be devoted primarily to the protection of mature timber and the young growing stock which furnish the basis of the future crops. Fire is the greatest menace to this growing stock.

The Forest Service has been paying particular attention to this phase of forest protection for several years, and each year sees the methods of protection brought to a higher state of effectiveness. In fact, the point has almost been reached when the American people—the owners of these vast timberlands—can be assured that the great bulk of the growing stock on the National Forests will be in good shape for harvest at the proper time. There are, however, several obstacles that still stand in the way of complete insurance of the freedom from serious damage to timber from fire. The chief of these in many parts of California is the proximity to the timber producing lands, of large areas of brush lands, which are not potentially valuable for timber production. Immense tracts of this type of land are either included within the forest in order to conserve the water supply, or lie just without the boundaries, where, because of their high degree of inflammability, they are a constant menace to the timber producing areas. The average fire, starting in this type of country, is only controlled through vigilant effort and the expenditure of much money.

The line between the brush and the timber producing areas, on the west slope of the Sierra Nevadas, is generally

a most clearly defined one, and in order to reduce the chance of serious damage to the timber, the idea of placing a cleared line between the two types was conceived in the fall of 1913, and this line was constructed along the proposed new western boundary of the Sierra National Forest (which coincides closely



FELLING A SNAG BY A SAW.  
NOTE HOW BADLY IT HAS BEEN BURNED.

with the lower timber line) in January and February, 1914. The purpose of this fire line is to afford cheaper and more effective protection to areas which should be devoted to the continued production of timber.

The conditions which had to be met were extraordinary, and it was found to



A SNAG FILLED BY POWDER, SHOWING METHOD OF QUICK WORK IN CLEARING A WAY THROUGH THICK GROWTH FOR A FIRE LINE.



FOREST RANGERS CLEARING OUT THE BACK FIRE LINE.

be impractical, from the point of view of both cost and effectiveness, to construct a wide, clean line of the German type. Fires originating in the brush country burn with fearful rapidity, and if left alone would sometimes sweep over a line half a mile in width. The cost of the construction of a line of this width would obviously be prohibitive. It was therefore decided to construct a line from which an organized fight could be directed. The usual method of combating fires in this type of country is to get well in advance of the approaching fire and clear the ground of all inflammable material for a few feet in width. Then the country between the cleared strip and the approaching fire is fired. The two fires burn together and go out for lack of inflammable material to burn. This method of fire control is in common use all over the State of California, but there are several serious difficulties in combating a fire in this way. A back fire line has to be run hurriedly through very rough country; oftentimes it is not rightly placed and frequently it is not possible for a crew of reasonable size to prevent the back fire, set out along the hastily improvised line, from jumping the slight barrier interposed.

To offset these difficulties, the following principles were outlined to govern the construction of the new type of line. It was to consist of three parts: (1) The back fire line, which is a narrow cut through the ground cover to mineral soil—in all respects similar to a line which a fire fighting crew would cut out to combat a fire in any given type. (2 and 3) To insure the successful handling of any fire, this back fire line was supplemented by the removal of the more inflammable material, such as down limbs, snags or clumps of heavy brush, for an average width of 100 feet in front and back of the cleared back fire line, in order to reduce the extra hazard. These two strips were to be known as the front and back protection strips. With this dangerous material out of the way, a ranger in charge of an efficient fire fighting crew could get well in advance of an approaching fire and back fire without fear of the back fire getting away from him. Special

emphasis was laid on the removal of old snags in front of the line. These snags very often are the means of throwing sparks across the back fire line and cause the loss of control.



BORING HOLES WITH AUGERS FOR THE CHARGES OF POWDER WITH WHICH THE TREE IS TO BE BLOWN DOWN.

The detailed location of the line was determined on in advance by rangers who had had a long experience in back firing work. Advantage was always taken of topography that would render the fighting of a fire less difficult. Roads, trails, open plowed fields, were used where they occurred as a part of the back fire line.

Wherever possible the line was also made so that it could be used as the basis for a patrolman's beat. Tool boxes and telephone instruments will be placed at frequent intervals along the line to facilitate the control of an approaching fire. Signs will be placed at living springs so that no time will be





DEAD TREE BEING BLOWN DOWN BY A CHARGE OF POWDER.  
THE SMOKE FROM THE EXPLOSION OBSCURES THE LOWER PORTION OF THE FALLING TREE.



METHOD OF PLOWING THE BACK FIRE LINE.

THIS WORK MAY ALSO BE SATISFACTORILY DONE BY DYNAMITING, THE EXPLOSION MAKING A DEEP AND WIDE TRENCH.

lost by the fighting force in locating available sources of water supply.

To do this work, twenty-four regular rangers were picked from the different forests in California, assigned to the Sierra Forest, and were there divided into two crews of twelve each. These crews were in charge of a foreman who was chosen from their number. The foreman subdivided his crew into groups that worked on different parts of the construction. Usually there were two snag crews, one equipped with falling saw, and the other equipped with augers and powder. In this connection, very interesting and valuable data in regard to the cost and effectiveness of these two methods of snag disposal was obtained. From four to six men were equipped with axes and it was their duty to brush out the back fire line for a width of ten to twelve feet and also remove such inflammable material as was necessary in front and behind this strip. After the line was brushed out,

two men came behind with a side-hill plow and plowed two furrows, one on each side of the back fire line, as close as the horses could go to the brush. The space between these furrows was then burned, leaving a back fire line free from any inflammable material.

The progress of the crews varied according to the type of the country, but each crew easily averaged a mile and a half of finished line per day. By February 20 the line had been built along the western boundary of the Sierra Forest, an approximate distance of one hundred and ten miles, at a cost of \$52 per mile. While the full value of this type of line cannot as yet be determined, there can be no doubt but that such a line will prove to be a big help in protecting the timber areas, simply because it will relieve the local organization from the necessity of constructing a line of less efficiency on very short notice and in the face of an approaching fire.

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*Plans for the Forest Products Exposition of Chicago, April 30th, are progressing satisfactorily. The preparations of exhibits by the affiliated associations is under way. A campaign of advertising, to induce attendance, will be undertaken in the near future. The manufacturers generally are requested to exert their utmost efforts toward creating interest in the expositions, which bid fair to be the most interesting and comprehensive ever held in this country.*

## PLANTING AND SEEDING OF WOODLOTS

BY GEO. LATTI BARRUS, NEW YORK STATE FORESTER

THE establishment of tree growth in the woodlot, or on large forest areas may be brought about by two methods, namely, natural reproduction and artificial reproduction. I wish to give some advice to woodlot owners on planting and seeding, and to draw their attention at this time to the planning of such work for the spring season. In another issue of this magazine there will be discussed the different systems to be followed in securing natural reproduction of forest growth. It will be learned from such discussion that, while natural reproduction is the ideal to be hoped for, there are certain fundamental requirements, at the start, necessary in order to make the adoption of that system possible, the most important factor being the presence of good seed trees of desirable species.

On vast areas of land in the United States not only are desirable seed trees lacking, but there are often no signs of any tree growth, leaving artificial reproduction as the only choice. Even in the small areas of woodlots there are often open spaces where planting or seeding is advisable to secure satisfac-

tory conditions. Thus, in any opening where grass is found, and where it would be difficult to secure reproduction of the best species, it would be wise to resort to planting. Only too often all the trees of the best species have been cut out from a woodlot, so that it would be impossible to secure their natural reproduction. Also it might be desirable to introduce species which had never grown there before. Again, in such spaces where the land is now occupied by large spreading trees of poor quality, it would be better to cut these out and plant.

There are very few woodlots which could not be very greatly improved by planting from one hundred to four hundred trees per acre. Like all other forest planting, the work can generally be done before the ordinary farm work is taken up, so that it will not interfere with that work. In case the market conditions warrant cutting of the poor material, generally the value received from such cuttings will be enough to pay for the cost of planting the woodlot with new stock, as this latter cost is very low.



*Photo by C. J. Ayres.*

THE LAND GIVES EVIDENCE OF BEING OCCUPIED IMMEDIATELY AFTER PLANTING.  
SCOTCH PINE ON ADIRONDACK SAND.

The first thought which occurs to the land owner ordinarily is that he can secure a forest growth much more cheaply and satisfactorily by sowing the seed directly on the ground instead of planting the trees. Where it is desired to start a growth of hardwood trees this is sometimes true, especially in the case of black walnut, red oak, hickory and some of the heavy seeded hardwoods. In such cases seed can be gathered from the trees and set out immediately or kept over winter and planted in the spring. Where squirrels and field mice are especially numerous, the spring planting is preferable. In such work it is necessary to have the mineral soil exposed, and also to have leaves and grass removed from the spot where the seed is planted, or if the seed is to be sown, the ground should be dragged with a light drag or an old stub of a tree which will tear up the ground surface.

Experience in planting trees and sowing seeds in the field under varying conditions clearly indicates that planting is a successful method, while broadcast sowing is too expensive and uncertain to be used generally.

#### WHEN TO PLANT.

Most of reforestation work has been done in the spring as soon as the frost is out of the ground, so the trees could be shipped. This means from the early part of April to the latter part of May, depending upon local climatic conditions. It is also possible to do such planting work in the early fall as soon as the long summer drought ceases and the fall rains begin. Coniferous trees in some cases can be planted as early as the latter part of August, but for fall planting of hardwoods it is better to wait until later when the leaves begin to fall.

#### WHAT TO PLANT.

In answer to this question the first requirement is to learn what are the native species making the best growth on the kinds of soil where your planting is to be done, and then decide which species will give the product desired for your use or marketable in your locality.

Of the trees adapted for planting in the Eastern States, perhaps the following named are some of those most likely to be chosen for a special product: White ash and red oak, for hardwood lumber; black locust, European larch, arbor vitae and catalpa (in restricted range), for fence posts, grape stakes or hop poles; white and red pine, Norway and red spruce and tulip poplar, for a supply of softwood lumber; Norway or red spruce and Carolina poplar, for pulpwood.



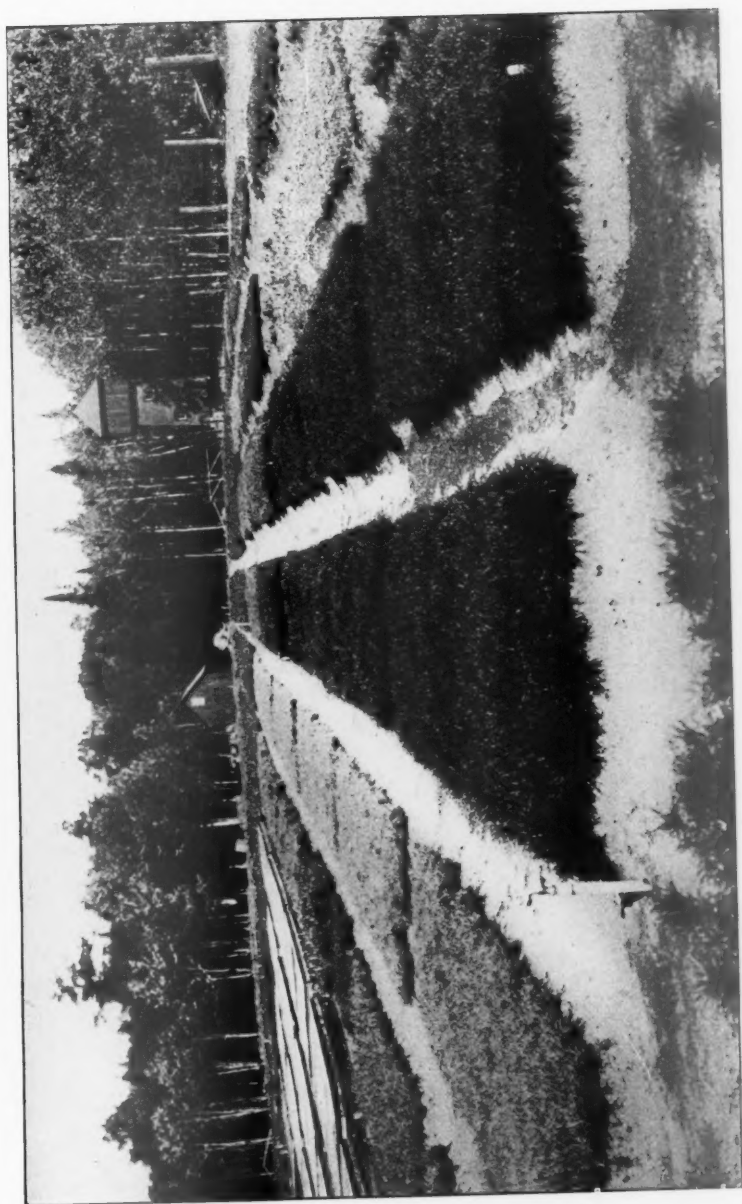
*Photo by G. L. Barrus.*

PITCH PINE SEED SPOT SIX YEARS AFTER PLANTING SEED.

In order to have the plantation successful and prove a profitable investment, there are certain factors, such as light, soil moisture, soil fertility, climatic conditions, fungus diseases and insect pests, which must be considered.

The pines are best adapted to light, sandy soils with but little fertility, while the spruce, tulip poplar and catalpa are quite exacting as to soil requirements.

The amount of moisture required by trees depends upon their root systems.



TWO YEAR SEEDLINGS IN THE NURSERY.

Such trees as Scotch, Austrian and red pine, black locust and red oak, make satisfactory growth on dry soil because their long tap roots are able to take up moisture from the lower sub-soil. There are no trees, however, which make a satisfactory growth on cold soils thoroughly saturated with water, because air in the soil is necessary.

All trees, in order to make a profitable growth, require light, but the maximum and minimum requirements vary considerably according to species. Light shade is beneficial to nearly all species when they are first planted, but some kinds, such as spruce, have the ability to withstand considerable shade. Often times there will be existing growth, such as grass, brambles, brush or brakes on the land to be planted. In such cases a liberal sized space should be cleared before planting the trees, so as to allow a fairly good opening to prevent the ground cover from choking out the trees or matting them down after the rank growth of the summer has been weighted down by the winter snow.

Of course it is hard to select any species which is not afflicted with insect pests or fungus diseases to a more or less extent. There are some species, however, which are especially undesirable for this reason. For instance, the chestnut should not be planted in the Atlantic States because of the chestnut blight, and in certain localities the locust borer works such havoc with plantations as to discourage the planting of this tree. Ordinarily, however, the locust will reach a size suitable for grape stakes or fence posts before the plantation is destroyed, and when sprout growth comes up after cutting, it gets a very good start before another attack is likely to occur. Where there is a ground cover of sweet fern the Scotch pine is apt to develop a fungus disease which requires the sweet fern as a host in order to carry out its life cycle. In some localities the white pine weevil causes considerable damage to plantations periodically and, in such cases, it might be best to consider the substitution of red pine.

#### SIZE OF TREES TO BE USED.

Ordinarily a land owner expects to receive trees three or four feet high, so

as to make an immediate showing, but the folly of using such stock is easily seen when we consider the cost of transportation, the increased cost of labor in setting them out, and finally the large percentage of loss where this large stock is used. Under most conditions the largest tree advisable for reforestation work is the four-year-old transplant and the use of this tree is not to be advised ordinarily unless there is filling in to be done where former planting has already made a fairly good start, or in

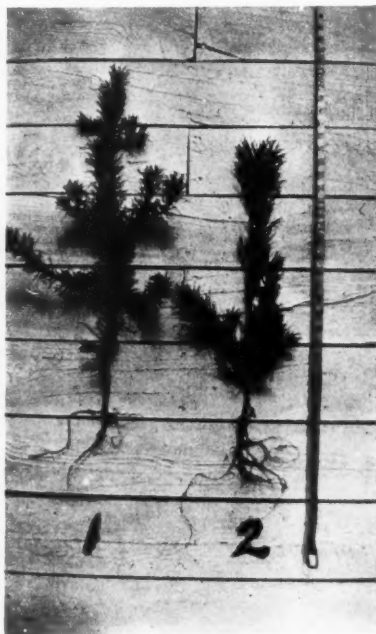


Photo by G. L. Barrus.

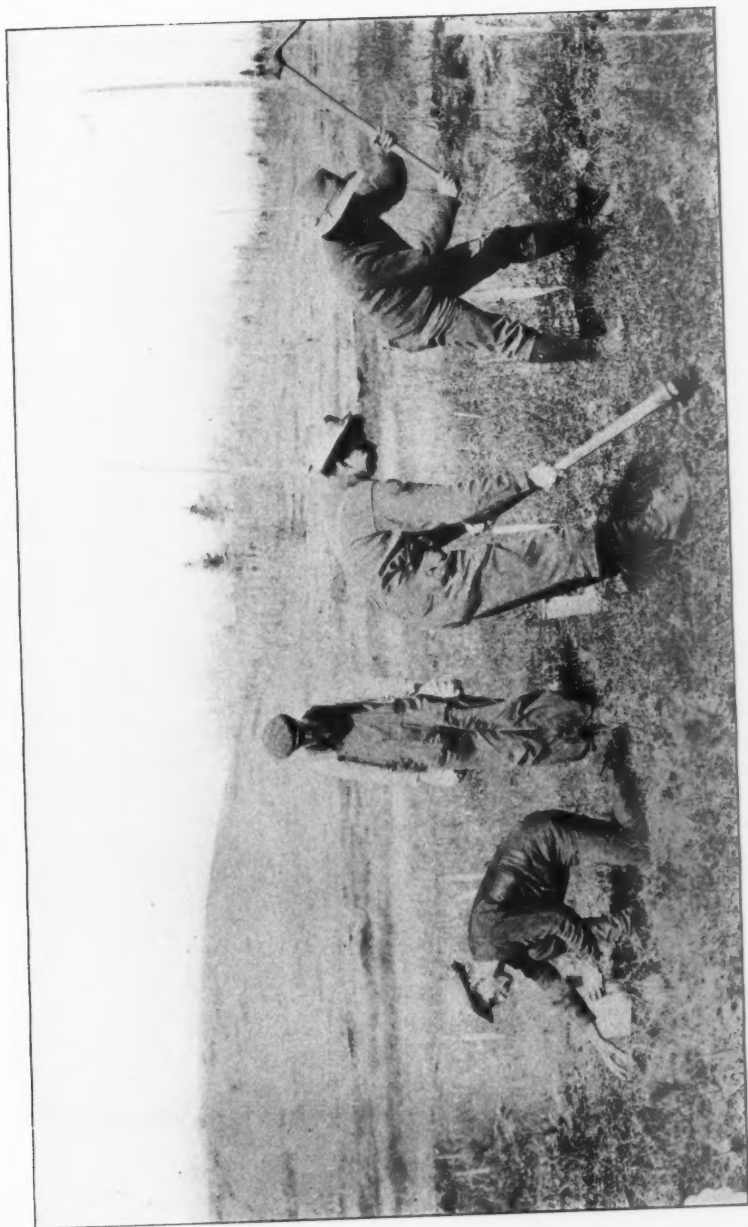
NO. 1—FIVE YEAR OLD SCOTCH PINE SEEDLING FROM SEED SPOT.

NO. 2—FOUR YEAR OLD SCOTCH PINE TRANSPLANT FROM NURSERY.

NOTE BETTER ROOTS ON NO. 2.

planting on very dry and exposed situations where the smaller transplants or seedlings could not survive. The best proportioned tree for ordinary planting is the three-year-old transplant which has a very well developed root system, even though the top does not make as much of a showing as that of the four-year transplant. The transportation of such trees is considerably less than the four-year transplant, and they are





THE FOUR STEPS IN PLANTING. 1. REMOVING GROUND COVER. 2. DIGGING THE HOLE. 3. SETTING THE TREE. 4. TRIMMING THE SOIL AROUND THE ROOTS.

much easier for the men to handle in planting.

In some cases, where there is not a dense ground cover, the two-year-old seedling will give satisfactory results, and when this stock is used, closer spacing could be adopted, assuring a sufficient number of trees for the final stand, even though a larger percentage of loss was encountered. In taking up such small trees from the nursery, we are bound to get a more complete root system with the small fibrous roots which are so essential to the growth of the tree.

#### HOW TO PLANT.

If the planting is to be done on a large scale, it will be necessary to organize the men in crews and to have trees purchased from a commercial or State nursery.

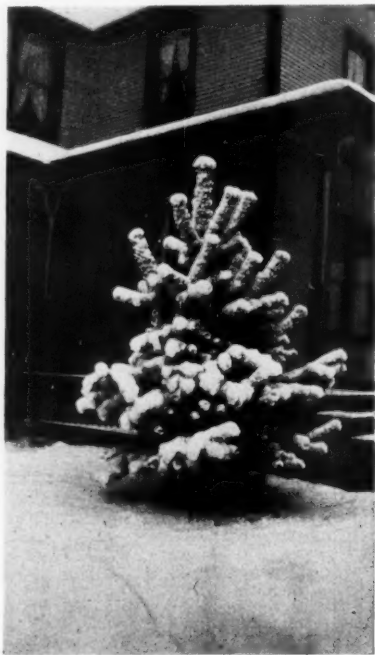
When the trees arrive they should be taken to the planting field and unpacked immediately. The roots should be dipped in water and the plants "heeled in," i. e., placed upright in a trench and the dirt packed tight around the roots. They can be kept in this manner while the planting is in progress.

The working unit is two men, one of them equipped with a grub hoe and the other with a pail for carrying the little plants. Two men working thus as a pair—one making the hole and the other planting the tree—will, after a little experience, set out about 1,000 transplants or 1,200 seedlings per day. If only a few thousand trees are to be planted, two men can do the work within the required time; but if many thousand, several pairs of men will be necessary.

In making a hole, it is well to cut off and remove a thin slice of sod, as this gives the plant a better opportunity to grow. The hole should be large enough to give room for the roots without crowding; but on a light soil the least dirt that is moved in order to set the plants properly the better it will be. The plant should usually be placed in the ground at the same depth that it was before; but on light, sandy soil it may be set slightly deeper. The earth should be packed about the roots thoroughly, so that the plant will be

able to get all the moisture possible from the surrounding earth. Care should be taken also to place the roots in their natural position.

Special pains should be taken to prevent any exposure of the roots to the sun. Once they become dry the plants are very likely to die. The trees "heeled in" should be kept moist at roots.



POSSIBILITY OF SCOTCH PINE AS A CHRISTMAS TREE.

*In planting spruce special care must be taken to get the tree in the ground the same depth as it has been growing. The roots should also be placed in as near a normal position as possible.*

Cultivation is not necessary before planting, but it will improve the growth of the plantation and is necessary for catalpa.

#### NUMBER OF TREES PER ACRE.

It is absolutely necessary that a much larger number of trees be planted on an acre than would be expected in a mature forest. It is not necessary, however, to crowd the trees the way they are found



USING TRANSPLANTING BOARD IN THE NURSERY.



BEFORE PLANTING.

This land is not fitted for agriculture. It is an evidence that the real cost of neglected waste areas on a farm is a general lowering of the whole farm value.

sometimes in nature, especially in natural seeding of white cedar or white pine. A close, dense stand is essential at the start in order to produce a proper development in the future growth, but it is wise to consider at the same time the initial cost of your planting, as this will affect the final profits.

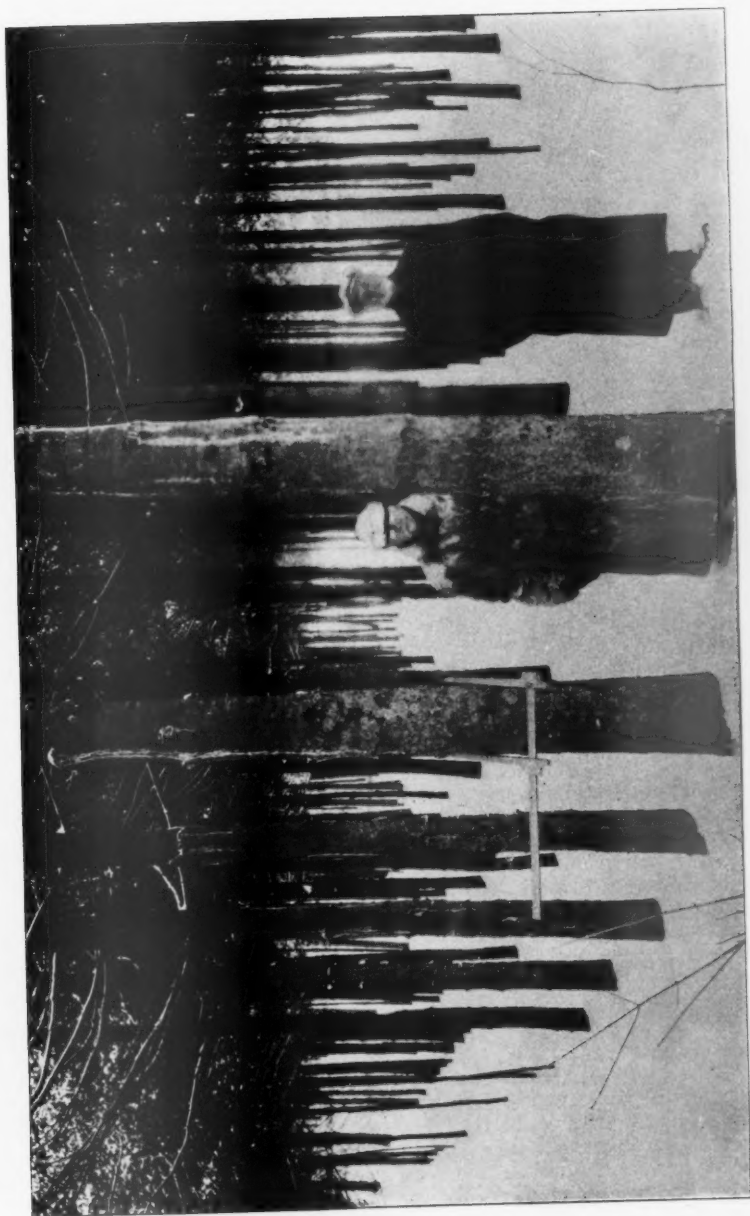
The close planting produces crowded and shaded conditions which kill off the side branches when the trees are small, reduce the number and size of the knots, and finally make a higher grade of lumber.

Such valuable results are easily seen when we compare the difference between trees which have grown naturally in a dense forest and those which have grown in the open. On the other hand, if too many trees are planted per acre, the cost is rapidly increased and tends to discourage the land owner from making the initial investment. Then too, the denser the stand, the sooner will thinning be necessary in order to get the best growth. Such early thinning ordinarily would not bring a profit in this country. In foreign countries where the fagot is in demand, closer planting and such early thinnings can be carried

on with some degree of profit. It is also possible that, if the right species could be grown on the soil in question, the early thinnings could be made with the idea of a supply of Christmas trees which would bring a profit in this country. The advisability of growing such a crop, however, would be governed largely by the proximity to available markets as well as the adaptability of balsam, Norway spruce or other Christmas trees to the soil where the planting is to be done.

In consideration of these factors, it is found that a spacing of six by six feet, requiring 1,200 trees per acre, is best adapted for most plantations.

The fast growing and light demanding trees, such as Carolina poplar and black locust, may be set at a wider spacing, for example, eight feet apart each way, requiring 680 trees per acre. In some cases a mixed plantation might also be desired where fast growing species would be alternated with slower growing and shade enduring species, with the idea that the faster growing tree would be taken out in the early thinnings. In such a case the trees might be planted



WHITE PINE PLANTATION RESULTS.  
28 YEARS OLD; 24,000 BOARD FEET BOX BOARD LUMBER PER ACRE.



FOUR YEARS AFTER PLANTING.

NOTE NOT ONLY THE MUCH BETTER APPEARANCE BUT ALSO THE VERY APPARENT INCREASE IN VALUE PER ACRE.

five feet apart, requiring about 1,740 per acre.

Planting in the farmers' woodlots should be done where necessary to fill up openings in the woodlots, which would take too long to seed up naturally, thus immediately putting all the land to productive use; to introduce new species to make the stand more valuable; or to ensure reproduction of most desired species, difficult to secure otherwise.

In underplanting in the woods, care must be taken not to plant where the light conditions or soil conditions are unsuitable to the species used; thus, white pine should have a moderate amount of light, Norway spruce could stand a considerable amount of shade and white oak would require much light.

Several States maintain nurseries where trees can be purchased at cost or at least at very reasonable rates. If there are no State nurseries, the State Forestry Department can refer you to reliable commercial nurseries and give you special advice for planting in your particular locality. Therefore the first thing to do is to communicate with the State Forestry Department. If there is no State Forest Service, then communi-

cate with the U. S. Forest Service at Washington, D. C.

Lumber companies or owners of large tracts remote from railroad lines can often avoid heavy transportation and hauling charges by establishing a small nursery near the planting site. The owner of a woodlot can perhaps even more easily start a small nursery in his garden patch.

The growing of hardwoods in a private nursery is perhaps even more a practical suggestion, especially for the owner of the woodlot. Seeds of the different hardwoods can often be collected in the vicinity of the woodlot and either sown in the fall or stored over winter and sown in the spring. If suitable precautions can be taken to prevent loss from squirrels or mice, better results usually are obtained from fall sowing from heavy seed of hardwoods, such as oaks, hickory, etc.

The seed could be sown in long rows spaced the same as transplants, so as to permit the use of a hand cultivator. The seeds should not be covered too deeply, ordinarily two to three times the diameter of the seed itself.

It is also possible and advisable in



some localities to gather small seedlings if they have come up naturally in a place where they are not desired, or too thick for a permanent stand. If transplanted in nursery rows for a year or two, they would develop much better roots and be better adapted for planting in permanent sites.

The cost of reforesting depends on many factors which go to determine the cost of the planting stock and the work of planting in the field. First of all the cost of stock will depend on where the same has to be purchased. There was a time, not many years back, when reforesting could not be advocated to any extent because trees could not be secured at a price reasonable enough to show results from a business standpoint. No one can expect land owners to undertake reforesting if they have to pay \$10 to \$30 per thousand for trees at the nursery. Since some of the States have started nurseries in recent years, commercial nurseries have come to realize this fact and they have been led to offer a smaller grade of stock suitable for reforesting at a more reasonable price.

In the majority of cases the public have not yet come to realize the fact that the best trees can be secured for reforesting at prices ranging from \$1.50 to \$6.00 per thousand. Of course such prices generally are quoted f. o. b. nursery so that the final cost of stock will depend upon the proximity of the planting site to the nursery. If you are fortunate enough to have your land located near a nursery where trees can be shipped by freight or hauled direct from the nursery by teams, the cost of stock will be at a minimum. If, on the other hand, the trees have to be shipped by express and then perhaps hauled twenty miles from express office to planting site, the cost is greatly increased.

The cost of planting is a still more variable quantity. The condition of land to be planted, the distance at which trees are spaced, the cost of provisions (depending on the season of the year or the distance toted), the amount of lost time due to bad weather, the experience of the men, the supply of labor, and the size of operation, are all factors influencing the cost of planting.

The reports from private plantings show variation of cost per acre from \$3.00 for underplanting with 400 trees, to \$16.00 for a maximum where trees are spaced six by six feet, requiring about 1,200 per acre.

Probably an average cost per acre for trees and labor would be about \$8 to \$12.



*Photo by G. L. Barrus.*

POPLAR WHIPPING TOP OF RED PINE AND RETARDING ITS GROWTH.

IN CASE OF UNDER PLANTING REMOVE POORER SPECIES WHEN THEY INTERFERE WITH THE BEST GROWTH.

For planting in the woodlot, the work can often be done at such times as not to interfere with other work and with permanently employed labor, so that the only actual investment is the cost of trees, about \$3 to \$6 per acre.

Returns come within a short time. The trees in from three to five years cover the unsightly parcels, thereby increasing the value of the entire tract. Careful studies of growth made in plantations show good yields and money returns from reforesting. Planting is not a matter of sentiment, but a sound business investment.



CHARCOAL KILN IN THE SPESSART MOUNTAINS.  
THEY RECEIVE ABOUT ONE AND A QUARTER CENTS PER CUBIC FOOT FOR THEIR LOPWOOD.

## THE HARDWOODS OF THE SPESSARTS

By F. F. MOON, M. F.

THE statement was made a short time ago by no less an authority than Mr. Pinchot, that up to the present time, in comparatively few instances has timber ever brought a price in the United States equal to the cost of production. A trip to the great hardwood region of Germany, the Spessart Mountains of Hessen, proves this statement beyond cavil.

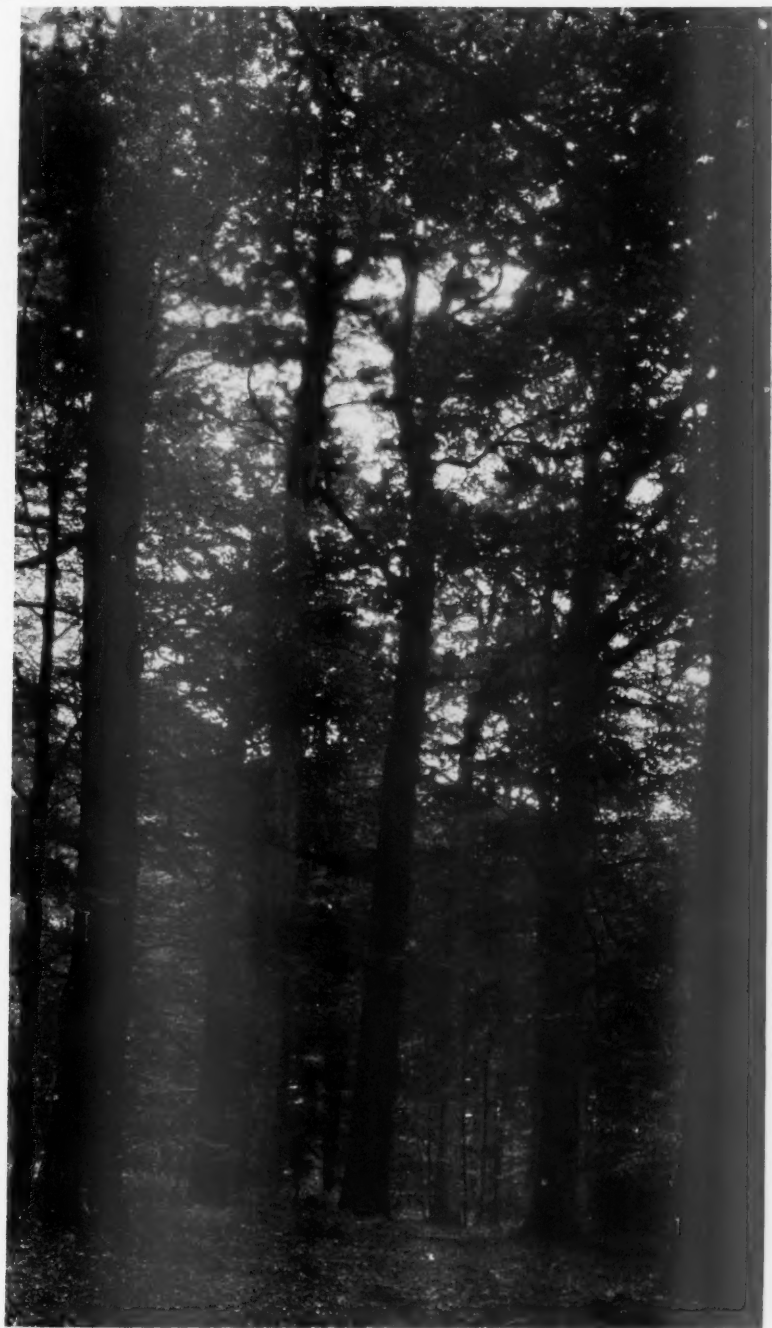
The Spessart Mountains are located in the bend of the Main River, are sterile as to soil, inclement as to weather, and unsuited for agriculture, but at present constitute a resource of enormous value, since they produce the bulk of the fine hardwoods for the German Empire. One-third of this region is devoted to timber production, and forestry and mining are the chief sources of employment for the inhabitants.

The development of this region as a broad commercial forestry proposition is of comparatively recent date as measured by their standards, regular silvicultural methods having been introduced about 1813. Previous to this time it had been used chiefly for a hunting preserve by the archbishops of Mainz. Even now portions of it furnish superior boar shooting, the Prince

Regent of Bavaria owning a large tract, completely fenced, near Rothenbuch.

When the church property passed into the hands of the state, the desultory methods were replaced by more scientific forms of management so that at present we find them handling these non-agricultural lands in an up-to-date manner instead of using methods that had their chief sanction from custom. Even now they realize that the rotations used in the past are entirely too long when the financial returns are taken into consideration, and that the mature stands of oaks and beeches, ranging in age from 800-1,000 years, while picturesque in the extreme, are not financially profitable, in spite of the high stumpage prices that prevail.

The revier at Rothenbuch gives a good idea of conditions and practices prevailing in this region. Mature forests are being rapidly cut off and replaced by seedling stands of oak and beech. Direct seeding is the chief method used in getting the stands started. The rows, approximately 1.5 meters apart, are hacked with a grub hoe at an average cost of about 30 marks per hectare (\$3 per acre), then the acorns are put in with a dibble at an additional cost of



*Photo by F. F. Moon.*

STAND OF OAK AND BEECH NEAR ROTHENBUCK IN THE SPESSART.  
THE OAKS ARE 800 YEARS OLD, SOME OF THEM HAVING 38 FEET CLEAR LENGTH WORTH \$750 EACH.



ON THE ROAD FROM ASCHAFFENBURG TO ROTHERHUCK.  
BEECH AND OAK COPPICE ON LEFT, CLEAR CUTTING NOW GOING ON IN CENTER AND PLANTATION OF AMERICAN WHITE PINE ON THE RIGHT.

*Photo by F. F. Moon.*

8-20 marks per hectare. As a result they may get as high as 20,000 seedlings per hectare. (8,000 per acre.)

At present they are doing little in the way of artificial regeneration of beech, since in the words of Forstmeister Endres, "Beech is a weed in this locality, both as to germination and growth, and comes in the oak plantations of its own accord."

Frequent thinnings are made and if, as in some instances, the stand has come up ragged, they will cut it clean and get a coppice stand of greater regularity and vigor.

In the past hogs were often pastured in the woods at mast time to force the nuts and acorns into the ground. At present, while a good deal of grazing is permitted, no dependence is placed on way of getting a forest started; artificial regeneration being the rule.

The care which is exercised in the proper utilization of their material and their efforts to keep up the value and reputation of their products is abundantly justified, since the prices they receive are enormous and Spessart oak is widely known for its quality and in great demand.

The very best sticks of clear oak are sold for veneer, the lower grades are used for planks and staves, and the tops and defective portions are made into charcoal on the ground, thus making their utilization practically complete.

The age of their largest trees (small annual growth), of course insures the fine texture and uniform quality needed for the veneer industry. One reason that was given here for the close planting method and is found to prevail in other parts of Germany, is that this close competition during the first decade or two of the trees, prevents rapid spongy growth in the core. We have hardly reached the point in the United States where we care to sacrifice early volume growth for later quality.

That these efforts at price and quality maintenance are not lost, the value of

the logs bear witness. In 1911 the average price they received per stem of oak was \$142 (stems averaged a little less than 2,000 board feet apiece, making the price about \$75 per thousand on the stump). They have received as high as 470 marks per cubic meter of oak or an equivalent of about \$375 per thousand board feet.

For their veterans that are free from branches for some distance above the ground, there is great demand; a butt log that will run six meters free from branches, is worth \$250, and one that is eleven meters in clear length brings \$750, on the stump. It is needless to say that this class of material is most economically used, being cut into the finest veneers.

For the stave material they receive 42 marks per stave (7-10 of a cubic meter), or about 40 cents per cubic foot, while for their lop wood, etc., they get about 1 1-4 cents per cubic foot.

Regarding the financial success of their methods, it has been found that the compound interest charges very largely eat up the profits on long rotations in spite of the enormous returns per acre. They are now planning to reduce the rotation to 250-300 years for the oaks and to introduce the faster growing spruce and pine.

We have in our Southern Appalachians some of the finest natural hardwood land in the world; land far better suited for the raising of trees than for agriculture; land which in the memory of middle aged men, has been cleared, tilled for a few years, and then allowed to grow up to brush. It is eminently fitting that we profit by the example of the Bavarian and Hessian foresters and turn this vast area, now producing nothing but a fraction of its capacity, into a magnificent hardwood producing region so that in the United States, Appalachian oak, like Spessart oak in Germany, may be a term with which to conjure. With the vigorous extension of the Weeks Act it is not at all improbable.

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*A California firm is selling eucalyptus charcoal at \$24 a ton, as against \$20 a ton for oak charcoal. Since most of the California-grown eucalyptus do not make good lumber, uses for other products of the tree are being sought.*

## SALT LAKE PRESERVES TIMBERS

**I**N REPLACING a railroad trestle recently burned, along the north shore of Great Salt Lake, engineers have just found that the piles are still perfectly sound after forty-three years of service. Looking for the cause, since these were only of local pine and fir, they found the timbers were impregnated throughout with salt from the lake.

At another point on the lake, eighteen inch piles, set twenty-nine years, are similarly preserved with salt, which has penetrated to their very center. Timbers in the Southern Pacific trestles across Salt Lake, placed in 1902, appear to be as good as on the day when the piles were driven. They have been preserved well above water line by the salt dashed on to them by the waves, a fact apparently anticipated by the engineers who built the trestles.

The first transcontinental telegraph line, built before the railroad, extended west from Salt Lake City through the prosperous mining camps of Eureka, Austin and Virginia City. When the railroad was built, the telegraph line was transferred to follow its right of way and the old poles sawed off at the ground. An engineer who recently examined the butts left in the ground in the salt desert near Fish Springs, found

that, although fifty years had passed since the poles were cut off, the old butts were perfectly sound.

Telephone and electric companies in the Salt Lake valley have used the local salt for preserving poles. When set up, about 75 pounds of salt is placed around the pole on the ground. This method cannot be used, however, when the pole is on or near a lawn, or in any place where vegetation is desired.

It is pointed out that the reason why the waters of Salt Lake act as a strong preservative, as distinguished from ocean waters, is because the lake water is so much saltier, being practically a saturate solution. Preservation with salt is of no use in ocean piling against the attack of teredos and other marine borers.

Experts in the Forest Service who have been investigating the preservative treatment of timber, offer the suggestion that ties and poles which have been immersed for some time in the waters of the lake ought to be impervious to decay, if the salt is not leached out by the action of the elements. It has been suggested that this can be guarded against, for example, by painting the butt of the pole with a coat of creosote, which will keep out the moisture and keep in the salt.

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## CARE OF SHADE TREES

**T**HE Tree Committee of the Laurel Hill Association, Stockbridge, Mass., has evolved a plan for arousing interest in the systematic care of the village shade trees which commends itself to other communities. The plan is outlined for the guidance of others:

In order to plan more intelligently for tree planting and tree removal, the town of Stockbridge has had a chart of its village trees plotted to scale.

The work has been done with the approval and authority of the selectmen and the tree warden by the committee on trees of the Laurel Hill Association,

a village improvement society which prides itself on being the pioneer of such societies.

The village main street is 100 feet wide and flanked on either side by a row of trees. Elms predominate, supplemented by maple, ash, linden and pine.

The largest of the elms is 17½ feet in circumference at a height of three feet above the ground and is probably about 160 years old.

In addition to the chart, the committee has issued a pamphlet for local distribution outlining briefly the number and varieties of the village trees



and showing the need of a comprehensive plan for the whole street in the matter of tree removals and replanting.

The charts and the pamphlet together make it easily apparent that the usual aversion to any sort of thinning of trees in public highways or parks is a mistaken attitude.

The committee have as yet charted only those trees on the roadway side of the property lines, but it is expected that property owners along the street, which is widely known for its perspective of arching trees and its well kept lawns,

will conform in their tree planting activities to the general plan indicated by the committee.

In addition to this landscape study, the committee supplements the town and private activities in the nature of spraying, trimming, and general care of the trees and expects to systematically call the attention of the residents of the town to any State or Federal bulletins on these general subjects as may be from time to time available for general distribution.

## MARYLAND CONSERVATION ASSOCIATION

THE first annual conference of the Maryland Conservation Association at John Hopkins University, proved to be a very successful and encouraging gathering of Marylanders in the good cause. The preamble to the by-laws of the association contains the statement that this association has been formed through the interest aroused by the Fifth National Conservation Congress, which was largely attended by Marylanders. That those attending the Congress felt desirous of advancing the cause of conservation in Maryland, and of reviving the organization formed some years ago for that purpose.

The addresses at the conference were as follows:

Conservation in the Nation and in the State, Senator Moses E. Clapp, of Minnesota.

The Smith-Lever-Agricultural Demonstration Bill, Congressman A. F. Lever, of South Carolina.

Relation of Farm Co-operative Demonstration Work to Soil Fertility, Brad-

ford Knapp, Esq., United States Department of Agriculture.

Bird Refuges and Game Propagation, John B. Burnham, Esq., New York, President, American Game Protective & Propagation Association.

The Shellfish Industry, Dr. H. F. Moore, Chief, Division of Fisheries.

The Bearing of Pollution of Tidal Water on Health, and the Necessity of Control of Pollution, Surgeon H. S. Cumming, United States Public Health Service.

The Value to Maryland of the Control of Water Carried Diseases in Town and County, and Measures Necessary to Accomplish It, Surgeon L. L. Lumsden, United States Public Health Service.

Patapsco Forest Reserve, Miss Katharine Lürman.

Old Fort Frederick, Judge Henry Stockbridge.

Forestry, Dr. Henry S. Drinker, President, American Forestry Association and President, Lehigh University, Pa.

## GEORGE W. VANDERBILT DEAD

IT WAS with the deepest regret that members of the American Forestry Association heard of the death recently of Mr. George W. Vanderbilt, of Washington, D. C., a vice president of the association and a man who has done much for the cause of forestry. The success of the forest planting on the

estate of Mr. Vanderbilt at Biltmore has long been known to students of forestry and has been an object lesson and an inspiration for similar work in other parts of the country. What Mr. Vanderbilt has done for forestry will be the theme of an article in an early issue of AMERICAN FORESTRY.

## HOW TO SAVE \$100,000,000 A YEAR

**S**O GREAT are the possibilities and so urgent the need of wider use of preserved timbers that it is estimated that \$100,000,000 a year would not cover the saving which could be made by the universal treatment of woods in commercial use, which are exposed to decay. A Forest Service bulletin issued five years ago made the estimate then that about \$72,000,000 a year would be saved if proper preservative treatment was given to all kinds of structural timber which can be treated with profit.

In order to show the wood using public just what may be done in wood preserving, the American Wood Preservers' Association has decided to have an elaborate exhibit at the Forest Products Exposition in Chicago, from April 30 to May 9, and in New York from May 21 to May 30. This exhibit will show the development of an industry which has trebled in the number of plants and quadrupled in the capacity of output during the past 10 years. By charts and graphic representations will be indicated the wonderful saving of treated over untreated material on both a cost and physical basis. All of the commercial woods of the country will be shown as to their adaptability for treatment, and the preservatives and processes best suited for various woods in different conditions will be exhibited. Railroad cross ties, which are treated to the extent of over 32,000,000 annually, represent the most important phase of the industry; but wood in a hundred other forms can be chemically preserved, and the more important of these miscellaneous uses, will be shown by actual wood specimens. The list of miscellaneous material suitable for treatment, includes piling, poles, paving blocks, construction timbers, cross-arms, fence posts, mine timbers and lumber of all kinds.

As irrefutable proof of the efficiency of proper treatment, many actual specimens of treated material, which has had long service, will be shown. There will

be creosoted piling from Galveston, which is still sound after 37 years in teredo infested waters; there will be wood blocks which have served as flooring for over 30 years; creosoted ties with a record of a quarter of a century in situations where untreated ties of the same character will rot in six years. There will be shown the possibilities of treating wood such as gum, sap pine, beech and other hardwoods, which rot quickly, so that they will resist decay almost indefinitely. This one development has opened an enormous field in the utilization of timber for which there was little or no market untreated.

The exhibit will demonstrate, for example, the advantages of framing timber before treatment, the boring and adzing of cross-ties before treatment, the distribution of preservatives in various woods, and the application of established principles in the preservative processes and ultimate use of the material. The more general educational features will be fully covered. In the center of the space will be a model of a typical plant and yard showing the equipment and general layout of a modern plant, also a model of a creosoted silo. Supplementing this will be transparencies and bromides of both general and special features in plant construction and operation, and the use and character of treated material.

Fundamentally the exhibit is being planned with the hope of bringing home to the lumberman, the architect, the engineer, and the general public, a realization which they have never had before of the magnitude and economic importance of the wood preserving industry. A lesson in conservation will also be taught through the obvious reduction of waste and the fuller service from wood in many forms. If the lessons which the exhibit will teach were fully applied, the economy expended would duplicate the annual expenditure on our army or navy in times of peace.

## FORESTRY LAW FOR VIRGINIA

SUCCESS has crowned the efforts of the friends of forestry in Virginia, who were inspired and vigorously aided by the American Forestry Association, to secure the passage of a forestry law in that State, ably directed by Senator R. S. B. Smith, the father of the bill, the campaign which secured its passage not only was successful but it has resulted in arousing state wide interest in forestry. The bill described in the AMERICAN FORESTRY for March, passed the Senate unanimously, and the House by a vote of 86 to 3, and has been signed by Governor Stuart. Virginia will now have such forest protection as it has so badly needed for many years past, and it is earnestly hoped that the operation of the law for the next two years will arouse the entire State to demand from the next Assembly, in 1916, a more complete forestry law and one which will provide for a liberal appropriation for the thorough development of the forests of the State.

The forests of Virginia supply the raw materials for an industry which is exceeded in the value of its production only by agriculture. Over 3,500 saw-mills operate in the State. The total amount of wood contributed annually by the forests exclusive of that for domestic use has a value of about \$25,000,000. Probably but one-third of this sum went to the owners of the timber, the remainder going principally to the wage earner.

Protection of the forests which supply the timber for these products is of fundamental importance. Fire is the forest's greatest enemy. The damage from fire in Virginia has been enormous. Probably as much timber has been killed by fire or burned up as has been

utilized. Thousands of acres are burned over annually and the normal loss each year by the injury to and destruction of mature timber is at least \$350,000. To this must be added the losses from the destruction of young growth, deterioration of the soil, slower growth of the timber, injurious effect on water resources, interruption of business, and depreciation of other property.

Virginia has a productive forest area of about 15,000,000 acres. On this area as a whole it is safe to say that the average annual production per acre does not amount to more than 150 board feet of log material. The total annual growth is, therefore, about 2,500,000,000 feet, which is less than the annual cut.

Through the application of forestry, including first of all protection from fire, this annual growth should be more than doubled. If, however, it were increased by only 10 board feet an acre, the annual timber growth of the State would be greater by 150,000,000 board feet. At the low rate of \$15 per thousand, this amount, if manufactured, would be equivalent to an increased annual income from timber products of \$2,250,000, to be distributed not only among the land owners, but mainly among those who furnish the labor and materials for marketing these products. To obtain this increased income the State could well afford to invest an appropriation of \$10,000, \$20,000, or even \$30,000. Sums such as these would moreover be very cheap insurance for the protection of standing timber estimated at upwards of 30,000,000,000 board feet, worth over \$60,000,000 to the owners, and many times that to the people of the State if saved for manufacture.

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*The Twelfth Annual Meeting of the National Lumber Manufacturers' Association will be held in Chicago in connection with the Forest Products Exposition May 5th and 6th, 1914. A program dealing principally with the merchandising of lumber is being prepared, to include addresses by representative architects, contractors, salesmen, fire insurance interests, retailers, etc.*

## A NEW SOAP MATERIAL

SETTLERS in western Kansas are cutting and marketing soap weed, or Spanish bayonet, to supply the demands of soap manufacturers, according to a report recently received from officers of the Kansas national forest. There are various plants in the southwest locally known as soap weed, called amole by the Mexicans, but the one gathered by the Kansas farmers, technically known as *Yucca bacata*, a species with exceptionally large fruits, is the most used. The soap manufacturers, however, utilize the tops or the roots. Manufacturers are paying \$8 a ton for the plant at the railway stations, while the estimated cost of cutting, drying, baling, and hauling ranges from \$5 to \$6, depending upon the distance to the railroad. Since a man can ordinarily get out a ton a day, the gathering of the soap weed affords an opportunity to secure a fair day's wages at a time when other ranch activities are not pressing. After cutting, the soap weed is allowed to dry from 60 to 90 days and then is baled up in the ordinary broom-corn baling machine.

For a long time this weed has been made into a soapy decoction which the Indian and Mexican women have used, particularly for washing their hair, for

which purpose it is considered especially suited, since it contains no alkali. Present day soap manufacturers use it for toilet and wool soaps. Its qualities have been known for a long time but the harvesting of soap weed is just now becoming commercially important.

The industry is now operating on lands adjacent to the Kansas national forest and it is expected that the demand will soon spread to that forest, some portions of which bear an abundant supply of the plant. There is a plentiful supply of it throughout southern Colorado, Arizona, New Mexico, and Texas.

Forest officers have considered this weed a nuisance since it is the nature of the plant to spread over extensive areas and kill off other vegetation. It is particularly a pest on stock ranges. In line with its policy of range improvement, the Government is anxious to rid the forage areas of all such injurious plants, and it is the hope of the forest officers that the commercial demand for soap weed will soon reach such proportions that it will not only take an otherwise useless product, but also will eradicate it from areas which could be utilized to better advantage for the supplying of forage to cattle and sheep.

## WHITE PINE GROWING PROFITABLE

THE growing of white pine, says the Department of Agriculture in a bulletin recently issued on the subject, is a profitable undertaking at 6 per cent compound interest. To bring in these returns, the trees may be cut when not more than from 35 to 70 years old.

The original white pine forests are approaching exhaustion, according to the department, and with the growing scarcity of large-sized, high-grade white pine lumber, lower grades now find a ready market. Besides this, the tree

grows rapidly, has a heavy yield, and is easy to manage.

Second growth white pine, 50 years old, on good soil, may yield as much as 49,000 feet of lumber per acre. On medium soil, stands of the same age 36,000 board feet, and even on poor soil, 24,000 feet. White pine boxboard lumber, one of the chief products of such stands, sells for from \$12 to \$18 a thousand board feet. Material for making matches, another product, sells for from \$17 to \$18 a thousand. Even larger material, suitable for sashes and

blinds, some of which may be cut from a 50-year-old stand, brings from \$30 to \$35 a thousand feet. Second-growth white pine, the kind that is found on thousands of abandoned fields and pastures in New England, and that which has sprung up after lumbering in many places where the original white pine forests stood, has a value today, says the department, that makes it well worth the attention of the owner.

Too often, caution the forest officers, the farmer or other land owner sells second-growth white pine stumpage for less than it is worth because he does not know how much lumber the stand is actually capable of yielding, or else is ignorant of the price the lumber and other products will bring. Too often, also, the foresters say, the owner of second-growth fails to realize that perhaps by holding his pine trees for a few

years longer, or by thinning it properly at the right time, he can obtain a great deal more and better timber, and consequently a much larger relative return in money, than if he allows it to be cut clear when the first opportunity offers.

The best second-growth white pine, 45 years old, will yield about 42,000 board feet per acre, but the same stand, when 55 years old, will yield 55,000 feet, an increase of 13,000 feet per acre in 10 years. And this is not all, for along with the increase in quantity comes an increase in quality. Not only more, but better timber is to be had. Counting in this factor of quality, the lumber from an acre of best white pine, 55 years old, is worth about \$1,000 against a value of \$750 when the stand is 45 years old.

## BEST SEED YEAR FOR LONGLEAF PINE

**F**OREST officers who have just returned from the southern states say that 1913 was the best seed year for longleaf pine for a long period of years, and that throughout its range the tree produced a full crop of seed. This is said to be particularly noteworthy because the species matures seed no oftener than from six to eight years, and often at longer intervals. In many sections the seed last year was so abundant that it collected in little heaps in ruts and other depressions.

Not only was the seed crop abundant, but weather conditions were unusually favorable, and by early December most of the seed had germinated and little seedlings 2 or 3 inches high are now growing in great numbers. In some cases, however, there was insufficient moisture during the fall, and the seed lying over the winter will germinate early this spring.

Throughout Louisiana, Mississippi, and eastern Texas many thousands of acres of longleaf pine forests are now carpeted with these seedlings. Counts made in December by the State Con-

servation Commission of Louisiana showed groups of seedlings as far as 300 feet from the nearest seed tree. Longleaf pine seed is relatively large, but it bears a filmy wing which causes it to revolve spirally when it is dropped from the cone, so that if winds prevail at the time the seeds are released they may be carried for considerable distances.

The reason forest officers are calling attention to the abundant seedling growth is that they may bring home to the owners of longleaf pine woodlands the peculiar need at this time for protecting these woodlands from fire. They point out that it would cost from five to ten dollars an acre to restock by artificial means what nature has done gratuitously this last fall, and emphasize the fact that the owners of longleaf pine lands, where natural reproduction has taken place in this way, should not fail to fight fires vigorously this season, and as many seasons thereafter as possible.

It is a common belief in many parts of the south that longleaf pine will not reproduce itself. This belief has arisen,

the foresters say, through a combination of the relatively rare seed periods and the annual recurrence of fires which run over the ground and destroy both the seed and such little trees as may start. The thick bark of the mature

longleaf pine makes it comparatively fire-resistant, but tender young trees are readily killed, and consequently the necessity for protecting them in a critical year like the present is particularly urgent.

## WINTER FOREST FIRES

**R**EPORTS for the winter fire season in the southern Appalachians covering the months of January and February, recently received by the Forest Service, show that the winter has been dry and that fires have occurred on land which the government is acquiring under the provisions of the Weeks Law. While these two months are normally not so dry as the fall or the spring fire season, serious fires may occur in an open winter, though they are not usual.

During January there were nine fires, five of which covered more than ten acres each. In February there were ten, of which only two spread over more than ten acres. All of these fires

occurred during the latter part of January and the first of February, when the weather was unusually dry.

The fact that the fires were reported from southern Virginia to northern Georgia, shows that the danger from fire was widespread. However, they occurred on only four of the twelve areas within which land is being purchased.

At least three-fourths of the fires were due to railroads. Forest officers say that until the southern states adopt and enforce laws requiring the use of adequate spark arresters on railroad locomotives, losses from forest fires can scarcely be prevented.

## THE FOREST RANGER.

Up through the high lands, the low lands, the snow lands;  
Covered with dust and decay of dead trees;  
Mushing the mire lands; facing scorched fire lands—  
The ranger's the man who is there, if you please!

Fording swift furies of wild mountain torrents;  
Bound by the weight of his fifty-pound pack;  
Over forest-choked passes; through torn jungle masses—  
The ranger—it's him you should pat on the back!

Twelve-month or eight-month, the long or short-term man;  
The man who puts seedlings in dead seedless slopes;  
Roustabout, ax-man, college man, pack-man—  
Your hat to them all, to their aims and their hopes!

Out in the wilderness, stripped of all mildness;  
Blood pulsing strong like the full sap of fall;  
Hearts full of gentleness; memories the tenderest—  
It's the ranger—here's health to them all!

P. C. Smith, 713 East Olive Street, Seattle, Wash.



## AMERICAN FORESTRY ASSOCIATION EXHIBIT

**A**N EXHIBIT of the work of the American Forestry Association will be made at the Forest Products Exposition at the Coliseum in Chicago, from April 30 to May 9, and at the Grand Central Palace, New York City, from May 21 to May 30. This exhibit will be in charge of representatives of the association and will be one which should attract a great deal of attention. Progress being made in the work of securing proper forestry laws in the various States, the organizing and encouragement of various State and local associations for the care and protection of forests, and the general

activity of the association in securing the wise conservation of forests and forest products will be explained to visitors. Members of the association are urged to attend the exposition and to take their friends to the association's exhibit.

The Forest Service will also participate and have perhaps the most complete exhibit it has ever displayed. Congress has appropriated \$10,000 for this exhibit.

Scores of lumber associations and various industries connected with the lumber and wood working business will also be represented.

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### FOREST NOTES

Members of the Tri-Counties Reforestation Committee of San Bernardino, Riverside and Orange counties, California, are much interested in conserving the flood waters of the Santa Ana River, and are giving their active aid in the endeavor to satisfactorily settle the problem which the difficulty presents. Francis Cuttle is chairman of the committee.

Sixty million feet of timber and 42,000 poles are offered by the government on the Kaniksu National Forest, near Priest Lake, Idaho. The timber is said to be of exceptional quality and all of it lies within four miles of Priest Lake, so that it is readily accessible and can be easily examined by prospective purchasers before the date on which bids are closed, June 1. Except for the pole material, which is cedar, the principal species are white pine and yellow pine. The timber now occupies some 5,000 acres.

One hundred and seven fires were reported during the last fire season to the Northern Forest Protective Association, with headquarters at Munising, Mich., according to the report of Secretary-Forester T. B. Wyman at the

annual meeting recently. Of these, 45 were caused by settlers clearing land, and 22 by locomotives. The loss amounted to \$1,900. The fire loss on abutting lands not listed with the association was \$12,600. Mr. Wyman reported plans for making the association's work still more effective, and addresses were made by State Forester Marcus Schaaf, R. S. Kellogg, secretary of the Northern Hardwood and Hemlock Association, and others. The area patrolled by the fire wardens during the fire season was 2,139,081 acres, and 22 wardens were used. Secretary Wyman emphasized the value of publicity work in educating the people to the necessity of taking proper precautions to prevent fires. The directors elected are: Thornton A. Green, timber lands, Ontonagon, Mich.; C. V. R. Townsend, Cleveland-Cliffs Iron Co., Negaunee, Mich.; W. H. Johnston, Oliver Iron Mining Co., Ishpeming, Mich.; James E. Sherman, Michigan Iron & Land Co., Marquette, Mich.; A. E. Miller, J. C. Ayer Estate, Marquette, Mich.; C. H. Worcester, Worcester Lumber Co., Chicago, Ill., and Chassell, Mich.; F. H. Smith, Oval Wood Dish Co., Traverse City, Mich.

Members of the Kennebec Valley

Protective Association held their second annual meeting at Augusta, Me., on March 3rd, and reported that the fire protective work done during the year was most satisfactory. The expenses for the year were so small that it was not necessary to make an annual assessment. The efficiency of the State work for the prevention of fire, a favorable summer and no protracted dry periods, all relieved the association of much expense for fire patrol or fire fighting. E. P. Viles of Skowhegan was elected president; W. J. Lanigan of Waterville, vice president, and F. H. Colby of Bingham, secretary-treasurer. F. H. Billard of New Hampshire spoke on the necessity of collecting accurate data to aid timberland owners to ascertain the cost of proper fire protection and the value of the work. President Viles also made an address on forestry conditions in Maine.

Among the many plans proposed for aiding in the prevention of floods, now that the flood season is near, is one for artificially increasing the absorbent qualities of subsoil on farm areas, slopes stripped of forests, and vegetation, by the use of dynamite. The plan appears to have merit as applied to farm lands for more reasons than its value in flood prevention, as by increasing the absorbent area of the soil it permits the retention of moisture to a greater degree than under normal conditions and this has a decidedly good effect in increasing the yield of crops. It is calculated that dynamite cartridges in holes three feet below the surface and 15 feet apart, exploded when the soil is dry, shatters the subsoil without creating any surface disturbance, and the water-holding capacity of the soil is greatly increased thereby. Experts declare it is particularly valuable in preventing erosion of side hill farms. The cost is estimated to be about \$15 an acre, and the treatment necessary once in 10 years.

An executive order just promulgated has resulted in an elimination of lands from national forest areas in Oregon.

This readjustment of boundaries has resulted in a total reduction of gross

area on the Paulina and Deschutes national forests of about 400,000 acres. The lands eliminated are located in the east-central part of the State, a considerable portion being on pumice lands of low fertility and little value for present or future forest purposes. A portion is located near the Deschutes River and already comprises a large percentage of private lands, and includes two towns. These eliminations are a part of the work of boundary examinations initiated five or six years ago, which is resulting in fixing, after careful survey, the definite boundaries of those lands which should remain permanently in forests.

The present eliminations are made because the land is not required for forest purposes or for the protection of watersheds. The lands have considerable grazing value, but only a small portion are suitable for agriculture under present conditions.

Secretary Lane of the Interior Department has recently given direction that an unnamed lake of great beauty in Glacier National Park be called Lake Ellen Wilson, in honor of the wife of the President. At the time of his visit last summer to Glacier National Park in Montana, Secretary Lane and his party were much impressed with the beauty of this lake which lies along the trail from Lake McDonald to Upper St. Mary Lake. This lake is about a mile long and half a mile wide. Lying more than a mile above sea level, the forests and cliffs which surround it are reflected from its surface as in a mirror.

The comprehensive report on the wood-using industries of New York, just issued by The New York State College of Forestry at Syracuse, shows results of first attempt to take stock of the use of forest products in the State. In line with suggestions above, it shows that such small and seemingly unimportant things as shoe lasts, dowels, spools and bobbins, wooden toys, wooden turnery, handles, brushes, small furniture parts, etc., are now being manufactured out of slabs, edgings, short

lengths, trimmings, defective tops and butts.

L. G. Johnson, formerly Deputy State Forester of California, has accepted the position as yard manager with the Frazer Lumber Company of Sacramento, California. Johnson is from Michigan Agricultural College, where he received his forestry training. G. M. Homans, State Forester, has appointed Alex W. Dodge to take the office made vacant by Johnson's resignation. Dodge is a Californian and graduated from the Yale Forest School in 1912.

It was most gratifying to President George E. Rex and the other officials of

the American Wood Preservers Association to find that over 20 committee members answered the call to meet at Chicago during the recent convention of the American Railway Engineers' Association. There was a time, not long ago, when less than 20 attended the annual meetings. The growth of the wood preserving industry and the rapidly growing realization of the value of treating wood for commercial use is now concentrating interest on the wood preservers' association and the important work it is doing. At the Chicago meeting committee reports were heard and arrangements completed for the exhibit at the Forest Products Exposition and for the plan of the next annual meeting.

## BOOK REVIEWS

*Logging*, by Ralph Clement Bryant (John Wiley & Sons, \$3.50). Mr. Bryant's series of articles in *AMERICAN FORESTRY* have attracted so much attention that it is idle to state that his book on the principles and general methods of logging in the United States is also heartily praised. It supplies a demand which for years has been apparent. The volume was prepared as a text book for use in the forest schools, but has had a much wider sale and is of interest and undoubted value to every one connected with the logging industry.

*Economic Woods of the United States*, by Prof. Samuel J. Record (John Wiley & Sons, \$1.25). The need of foresters, timber inspectors and wood users to be able to distinguish the woods with which they deal inspired this book. The number of such woods is so large and the difference between many of them so slight that mere familiarity with their general appearance is not always sufficient for their proper identification. This book supplies information and illustrations which largely solve the problem of identification.

*A Forest Idyl*, by Temple Oliver (Sherman,

French & Co., Boston, \$1.20). A story of the poetry of rural life, the value of getting back to Mother Nature and at the same time a cleverly woven romance, make this book entertaining, instructive and restful, and a strong plea for the back-to-the-land movement.

*Trees in Winter*, by Albert F. Blakeslee and Chester D. Jarvis (Blakeslee and Jarvis, Storrs, Conn., \$2.00). Many people desire to know what trees to select for various purposes, where, how and when to plant them, and how to care for and protect them. This book aims to give such general knowledge of trees and tree conditions. It is well illustrated.

*The Commuter's Garden*, by W. B. Hayward (Crowell Co., New York, \$1.00). This is a book for those who love gardens and take care of them. In an interesting manner is given information about care of lawns, flowers, plants, vines, shrubbery, hedges, and in fact about everything in relation to a garden which may prove of value. There are also hints about care of hens, cows and bees. It is good reading.

*Fifteen small sawmills are cutting timber from the Powell national forest in southern Utah, more than 100 miles from the nearest railroad. They are run by settlers during time that can be spared from the crops, and supply local needs, since there is no opportunity to ship timber in or out.*

*That a serious decline in the carrying capacity of vast areas of western grazing lands, due largely to the fact that stockmen fail to give the range plants a chance to keep growing, can be remedied without closing these areas to cattle and sheep, is the statement made by the Department of Agriculture in a bulletin recently issued on range improvement. Excessive grazing in the spring before the forage crop is mature, and such grazing continued year after year, says the department, are the main causes of range deterioration.*

## STATE NEWS

### Missouri

The Board of Curators of the University of Missouri at its regular meeting February 18, 1914, delegated the administration of the College Lands to the Department of Forestry of the College of Agriculture. The College Lands comprise more than 50,000 acres in the Ozark Region of Missouri. They are the remnant of the land grant received by the University from the United States under the terms of the Morrill Act of 1862. These lands are chiefly valuable for forestry and the Department of Forestry has formulated plans for their administration and utilization.

On vesting the management of these lands in the Department of Forestry, the Board of Curators has provided the funds necessary for meeting the expenses of administration, including the employment of forest wardens for local patrol work. Four forests will be organized this spring, a field force built up, and boundaries established and posted. Sales of stumpage will be made where advantageous.

Special funds were also provided for a reconnaissance survey and the Department of Forestry expects to cover the whole area this summer. Work will start June 15, directly after the close of class work at Columbia, and will continue for three months. Two parties will be maintained in the field. The Department of Forestry will give its whole attention to this field work and to a study of the wood using industries of the state during the coming summer; no Summer Forest Camp will be opened this summer, since with the change in the curriculum the Camp has been advanced from the end of the sophomore to the end of the junior year.

### Ohio

The *Ohio Forester*, the organ of the Ohio State Forestry Society, will hereafter have a certain portion of each number edited by the faculty and students of the Forestry Department of the Ohio State University.

By this means the department of the University will have a publication and at the same time the *Forester* will be strengthened and increased in its scope.

Mr. Edmund Secrest, chief of the Department of Forestry of the Ohio Agricultural Experiment Station, has just returned from Europe, where he spent the past autumn and winter studying forest conditions in several European states.

### Vermont

At the last session of the Vermont Legislature, the State appropriated \$10,000 to the Agricultural College for agricultural extension work. An Extension Department of the College has been formed, and numerous short courses have been given in the rural communities of the State. One of the faculty of

this School, is a trained forester, Mr. B. A. Chandler, who is a graduate of the Yale Forest School. In his connection with the Forestry Department of the State Mr. Chandler has become well acquainted with the local conditions and is, therefore, well able to give the farmers and the timber land owners the kind of information which they must have in dealing with their woodlands. Particular interest is manifested in the matter of timber estimating. The farmers are beginning to realize that they have, in many cases, sold their timber for much less than it was worth. Now that the Lever Bill has passed Congress, a much larger sum will be available for the Agricultural College for extension work, and it is hoped that forestry will receive its fair proportion of this sum, since the Congressional allotment is on the basis of similar allotments by the states, and Vermont is spending as much for forestry work as for any other branch of agriculture.

### Kentucky

The fire situation had already assumed serious aspect in certain parts of the State when rains and snows came along and put a stop to the fire danger for a brief period. Approximately March 15 about thirty patrolmen will be appointed in the Eastern part of the State in as many counties, and an additional district patrolman will be appointed. In addition to these appointments, two county forest protective associations in Bell and Harlan Counties, respectively, are in the process of organization. A similar cooperative association among the timber land owners of Rowan County is doing effective work. The County Forest Protective Association of Harlan County is contemplating an assessment of one cent per acre on its members for fire protective work. In view of this cooperation on the part of private timber holding companies with the office of the State Forester, it seems probable that the fire hazard will be greatly reduced during the year of 1914. At the Louisville Nursery the spring planting is under way and it is expected very materially to increase the capacity of this nursery.

The State Forester has been giving a series of six lectures on History of Forestry and Forest Policies at the State University at Lexington. This is the beginning of an effort to make forestry a live issue at the State University.

### Pennsylvania

At the meeting of the Reservation Commission for March 15 new permanent camp sites were leased, bringing the total number of permanent camps leased upon State lands close to one hundred.

A new house for the forester of the Rothrock Forest in Mifflin County, and a new house for

one of our rangers on the Seven Mountain Forest in Centre County, were authorized.

During the months of January and February the receipts from the sale of material from the State Forests have amounted to almost \$3,900.

#### Louisiana

The Conservation Commission of Louisiana is making a special effort to prevent forest fires and is calling attention to the laws making it a misdemeanor, punishable by fine and imprisonment, negligently or wilfully to set on fire or cause to be set on fire any forest, brush or grass lands. The Commission urges the sheriffs and other parish officials and the officers of railroads and lumber companies to cooperate with the conservation agents throughout the State in preventing, and, if necessary, in punishing violators of the law.

The Commission considers the application of laws on this subject a matter of vital importance, and is using every means possible of acquainting the public with the laws on the subject and securing their enforcement.

#### Massachusetts

The Massachusetts Forestry Association has been working several years to obtain a slash law which would be workable in Massachusetts and at last, with the cooperation of other organizations, it has succeeded. This law is not all that might be desired in this section but it is a long step in the right direction. The law provides as follows:

Section 1. Every owner, tenant or occupant of land, and every owner of stumpage, who cuts or permits the cutting of wood or timber on woodland owned or occupied by him or on which he has acquired stumpage by purchase or otherwise, and which borders upon the woodland of another or upon a highway or railroad location, shall clear the land of the slash and brush wood then and there resulting from such cutting for such distance, not exceeding forty feet, from the woodland of such other person, highway or railroad location as the local forest warden shall determine, and within such time and in such manner as he shall determine.

Section 2. Any person who cuts or causes to be cut trees or bushes or undergrowth within the limits of any highway or public road, shall dispose of the slash and brush wood then and there resulting from such cutting within such time and in such manner as the forest warden of the city or town wherein such cutting is done shall determine.

Section 3. Whoever neglects to comply with the directions of the forest warden with regard to the disposal of slash and brush, as provided in Sections one and two of this act, may be punished by a fine of not less than five dollars nor more than fifty dollars.

Section 4. This act shall take effect on the first day of January in the year nineteen hundred and fifteen. (Approved February 25, 1914.)

It will be noticed that the local fire warden is the officer named to enforce this law. It would seem that in some cases this may not be very effective, but with our present State fire protective system, with a State fire warden and several efficient deputies who are constantly travelling over the State, that these wardens will be instructed and requested to do their duty. With this fact in view, it is felt that the law will bring very satisfactory results in this State.

#### North Carolina

The Forestry Club of Tryon, Polk County, North Carolina, was organized last fall and is now in very active operation. This association arose out of the very pressing need of fire protection in that county. Forest fires during November in western Polk County were the worst ever recorded. It was estimated that in four townships, 28,000 acres of hardwood land were burned over, causing a loss of \$3,000 to \$4,000 to property exclusive of the injury to timber and young growth. This latter damage was estimated by one man on the ground at \$60,000, which certainly is a very conservative estimate. The people of the county were so stirred up over the necessity of taking some action to prevent a recurrence of such destructive fires that the Forestry Club was organized. Mr. E. R. Rankin was elected president, and G. B. Cobb, secretary, while C. M. Howes was appointed fire warden. The club has already offered a reward of \$50 through the county commissioners for the arrest and conviction of any person who sets fires in the woods contrary to law. It has also prepared and distributed handbills on which are printed the State laws against setting fires.

The annual meeting of the State Forestry Association, which is to be held in Asheville April 8th, 9th and 10th, promises to be the most interesting and largely attended of any similar meeting held in the State. The American Forestry Association will be represented and several men of national reputation are amongst the speakers. Governor Locke Craig, Mr. Overton W. Price, Vice-President of the National Conservation Association, and Mr. W. B. Townsend, Townsend, Tenn., have all promised to make addresses, while Mr. H. S. Graves, U. S. Forester, and Congressman John H. Small, have also signified their intention of being present and taking part in the proceedings. An extra day has been added in order to provide for a trip into Pisgah Forest where logging is now going on in mountain hardwoods under strict and yet reasonable forestry regulations. An alternative trip for this day (April 10) has been arranged to the large pulp factory of the Champion Fibre Company at Canton, N. C. These, with the trips to the forest plantations of the Biltmore Estate, and the spruce forests on the slopes of Mt. Mitchell, make this an unexampled opportunity to become thoroughly acquainted with the southern Appalachian forests and with the practical methods for their management.



## New York

In 1908 the New York Central Railroad caused fires which burned over some State land in Adirondacks and destroyed a quantity of forest area. Two actions were brought to recover damages. In each case an award for the full value of all of the material, injury to soil, etc., was awarded the State.

The railroad company demurred on the ground that timber upon State land was without value because the Constitution prohibited its removal. They also further argued that the measure of damage was ascertained by the value of the property before the fire, less whatever salvage might be derived, the State claiming that the Constitution prohibited removal of timber, there could be no salvage and, therefore, the loss was entire. The Appellate Division Court of New York State has just handed down a decision confirming the judgment of the Supreme Court in the previous case. The Railroad Company will doubtless make an appeal to the Court of Appeals.

In 1908, at the time these injuries were caused, the State did not prescribe any penalty, nor more than actual damage. Since that time a law has been enacted which prescribes a penalty of ten dollars for trees killed upon State land, and a penalty of one dollar for trees killed upon private land, together with damages.

## New Jersey

Good advice relative to Arbor Day observances is given in a circular issued by the Forest Commission and the Department of Public Instruction of New Jersey. Arbor Day is to be April 10. The circular says: "Tree planting, though important, has been somewhat overdone in connection with Arbor Day observances. If there is room for more trees on the grounds of any school, or in nearby parks, let the occasion be used for planting with appropriate ceremonies, but it often will be better to organize a squad of pupils to cultivate and fertilize the ground about trees already established, to provide and maintain suitable guards, to conduct a campaign against insects, or in some other way to awaken a *continuing interest* on behalf of trees. It is well to keep in touch with the town or city shade tree commission.

"In this State there is no dearth of forests; in some places we have too much woodland. The exercises in country schools, therefore, may serve to give emphasis to local needs and interests, especially to the control of forest fires by which so much property is lost. There is a forest fire warden in every part of the State where there is danger of forest fires. He may be asked to take part in the exercises and point out how the pupils can help in this work. They can do much."

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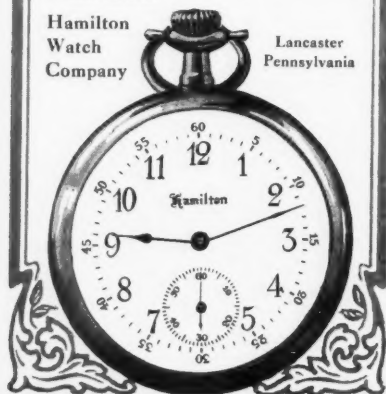
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